STIC Search Report
EIC 3700

STIC Database Tracking Number: 127458

TO: Kurt Fernstrom **Location: cp2 10b14** **Art Unit: 3712** **Wednesday, July 21, 2004** **Case Serial Number: 09/711002**	**From: Emory Damron** **Location: EIC 3700** **CP2-2C08** **Phone: 305-8587** **Emory.Damron@uspto.gov**

Search Notes

Dear Kurt,

Please find below an inventor search in the bibliographic and full-text foreign patent files, as well as keyword searches in the patent and non-patent literature files, both bibliographic and full text.
References of potential pertinence have been tagged, but please review all the packets in case you like something I didn't.
In addition to searching on Dialog, I also searched EPO/JPO/Derwent, EricAdvanced, ScienceDirect and Scirus.com.
I found a few good useful references in the patented art, but I think the tagged articles in the nonpatent literature are more compelling, in my opinion.
Please contact me if I can refocus or expand any aspect of this case, and please take a moment to provide any feedback (on the form provided) so EIC 3700 may better serve your needs.
Sincerely,

Emory Damron
Technical Information Specialist
EIC 3700, US Patent & Trademark Office
Phone: (703) 305-8587/ Fax: (703) 306-5915
Emory.damron@uspto.gov

STIC Search Results Feedback Form

EIC 3700

Questions about the scope or the results of the search? Contact ***the EIC searcher or contact*:**

John Sims, EIC 3700 Team Leader
308-4836, CP2-2C08

Voluntary Results Feedback Form

- *I am an examiner in Workgroup:* 3712 *Example: 3730*
- *Relevant prior art **found**, search results used as follows:*
  - ☐ 102 rejection
  - ☐ 103 rejection
  - ☐ Cited as being of interest.
  - ☐ Helped examiner better understand the invention.
  - ☐ Helped examiner better understand the state of the art in their technology.

  Types of relevant prior art found:
  - ☐ Foreign Patent(s)
  - ☐ Non-Patent Literature
    (journal articles, conference proceedings, new product announcements etc.)
- *Relevant prior art **not found**:*
  - ☐ Results verified the lack of relevant prior art (helped determine patentability).
  - ☐ Results were not useful in determining patentability or understanding the invention.

Comments:

Drop off or send completed forms to STIC/EIC3700 CP2 2C08

Access DB# 127458

SEARCH REQUEST FORM

Scientific and Technical Information Center

Requester's Full Name: Kurt Fenstrom Examiner #: 75063 Date: 7/16/04
Art Unit: 3712 Phone Number 305-0303 Serial Number: 09/711,002
Mail Box and Bldg/Room Location: CP2 10B14 Results Format Preferred (circle): (PAPER) DISK E-MAIL

If more than one search is submitted, please prioritize searches in order of need.

****

Please provide a detailed statement of the search topic, and describe as specifically as possible the subject matter to be searched. Include the elected species or structures, keywords, synonyms, acronyms, and registry numbers, and combine with the concept or utility of the invention. Define any terms that may have a special meaning. Give examples or relevant citations, authors, etc, if known. Please attach a copy of the cover sheet, pertinent claims, and abstract.

Title of Invention: Instrument for Contemplation

Inventors (please provide full names): Minegishi Yukio, Iwada Yasuo, Matsuzaki Toshimichi

Earliest Priority Filing Date: 12/27/99

***For Sequence Searches Only* Please include all pertinent information (parent, child, divisional, or issued patent numbers) along with the appropriate serial number.**

see attached

STAFF USE ONLY

Searcher: Emory DAMRON
Searcher Phone #: 305 8587
Searcher Location: CP2 2C8
Date Searcher Picked Up: 7/19/04 3P
Date Completed: 7/26/04 845A
Searcher Prep & Review Time: 300m
Clerical Prep Time: 0
Online Time: 300m

Type of Search

NA Sequence (#) _____
AA Sequence (#) _____
Structure (#) _____
Bibliographic X
Litigation _____
Fulltext X
Patent Family _____
Other _____

Vendors and cost where applicable

STN _____
Dialog X 1242, 31
Questel/Orbit _____
Dr.Link _____
Lexis/Nexis _____
Sequence Systems _____
WWW/Internet + SCIRUS/SCIENCE DIRECT/ERIC
Other (specify) _____

PTO-1590 (8-01)

```
Set     Items   Description
S1      38375   BRAINSTORM? OR BRAIN()STORM? OR PROBLEM()(SOLVE? OR SOLVING
              OR SOLUTION?) OR HASH()SESSION? OR CONFERENC? OR MEETING? OR
             COMMITTEE? OR GROUPTHINK? OR GROUP()THINK? OR TELECONFER? OR -
             VIDEOCONFER?
S2    2968936   THOUGHT()RESULT? OR IDEA? ? OR TACTIC? OR STRATEG? OR CONS-
             ENSUS? OR SOLUTION? OR RESOLUTION? OR RESOLV? OR DECISION? OR
             OBJECTIVE? OR TASK? OR AIM OR AIMS OR GOAL? ? OR ACCOMPLISH?
S3    1207143   COMPUTER? OR MICROPROCESS? OR MICRO()PROCESS? OR DATA()PRO-
             CESS? OR WORD()PROCESS?
S4     998273   TERMINAL? OR SERVER? OR DESKTOP? OR DESK()(TOP OR TOPS) OR
             WORKSTATION? OR WORK()STATION?
S5     240854   CPU OR CENTRAL()PROCESS? OR PROCESS?()UNIT?
S6     422859   CRT OR CATHODE()RAY()TUBE? OR DISPLAY?(2N)(MEDIUM OR MEDIA
             OR DEVICE? OR APPARATUS? OR SCREEN?)
S7    2228177   MEMORY? OR STORE? OR STORING OR STORAGE OR RAM
S8     427264   INTERNET? OR NETWORK? OR EMAIL? OR E()MAIL? OR LAN OR WAN -
             OR ETHERNET? OR INTRANET?
S9      73924   SOFTWARE? OR SOFT()WARE? OR SPREADSHEET? OR SPREAD()SHEET?
S10     89532   (SELECT? OR PARTICIP? OR SUBJECT? OR THOUGHT?)(3N)(CELL? OR
              UNIT? OR BLOCK?)
S11    283315   MATRIX? OR MATRIC? OR GRID? ? OR CIRCLE()GRAPH? OR FAN()SH-
             APE?
S12   1184825   NARROW? OR ATTENUAT? OR FILTER? OR CULL? OR STREAMLIN? OR -
             STREAM()(LINE? OR LINING) OR PARE? OR PARING OR WHITTL? OR ED-
             IT??? OR REDACT? OR TRIM? OR PRUNE? OR PRUNING
S13   3836600   CONDENS? OR LIMIT? OR RESTRICT? OR REFIN? OR REDUC? OR DIS-
             TILL? OR BOIL?()DOWN OR ABBREVIAT?
S14    152101   RANK? OR SORT? OR HIERARCH? OR PRIORIT? OR CATEGORIZ? OR C-
             ATEGORIS?
S15    674086   COLOR? OR COLOUR?
S16   1747681   PLURALIT? OR MULTIPL? OR SEVERAL? OR MULTITUD? OR MORE()TH-
             AN()ONE OR "MORE THAN ONE" OR NUMEROUS? OR MANY
S17   1161308   IC=(G09B? OR G06F? OR G06N?)
S18    393452   S1:S2 AND S3:S6
S19    129114   S18 AND S17
S20     18346   S19 AND S6
S21      8394   S20 AND S7
S22      1054   S21 AND S8
S23        13   S22 AND S10:S11
S24        60   S22 AND S9
S25        73   S23:S24
S26         5   S25 AND S12:S14(10N)(S1:S2 OR S10:S11)
S27         1   S25 AND S15
S28         8   S25 AND S16(5N)S1:S6
S29        73   S25:S28
S30        73   IDPAT (sorted in duplicate/non-duplicate order)
? show files
File 347:JAPIO Nov 1976-2004/Mar(Updated 040708)
        (c) 2004 JPO & JAPIO
File 350:Derwent WPIX 1963-2004/UD,UM &UP=200445
        (c) 2004  Thomson Derwent
?
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30/3,K/14 (Item 14 from file: 350)
DIALOG(R)File 350:Derwent WPIX

012933356 **Image available**
WPI Acc No: 2000-105203/200009
XRPX Acc No: N00-080830
Simultaneous spreadsheet **editing system used for analyzing data and formula**
Patent Assignee: MICROSOFT CORP (MICT)
Inventor: BHANSALI A; MICHELMAN E; RILEY W T; WAD R V
Number of Countries: 001 Number of Patents: 001
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
US 6006239	A	19991221	US 96617973	A	19960315	200009	B

Priority Applications (No Type Date): US 96617973 A 19960315
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
US 6006239	A		18	G06F-017/30	

Simultaneous spreadsheet **editing system used for analyzing data and formula**

Abstract (Basic):
... The method involves identifying intervening changes in simultaneously edited **spreadsheet** . The changes in **spreadsheet** are **stored** in **memory** change log 1 (60) of **computer** (10b). These changes are merged with changes in **spreadsheet** **stored** in **memory** change log 2 (64) of **computer** (10c), copied in disk change log (56).
... The merging of intervening changes is done by determination of existence of conflicting changes between **spreadsheets** of users of **computers** (10b,10c). The merge is done by copying changes of user of **computer** (10b) and reference adjusting it with that of user of **computer** (10c). Then **resolving** of conflicting changes either by automatic selection of losing change or its removal is carried out. An INDEPENDENT CLAIM is also included for **software** used for editing **spreadsheet** .
...

...For allowing multiple users to simultaneously edit the same **spreadsheet** which is used for analyzing data and formula...

...Allows multiple users to access **spreadsheet** **stored** in a disk file to make independent changes. **Resolving** of conflicting changes is done by identifying the changes, allowing user to select the losing change from displayed dialog box of **display** **screen** .
...
...The figure shows diagram of a **networked** **computer** system for simultaneous editing of **spreadsheet** .
...

... **Computers** (10b,10c...

... **Memory** change log1 (60...

... **Memory** change log2 (64
International Patent Class (Main): **G06F-017/30**

30/3,K/15 (Item 15 from file: 350)
DIALOG(R)File 350:Derwent WPIX

012443990 **Image available**
WPI Acc No: 1999-250098/199921
XRPX Acc No: N99-186710
Work flow management system for client- server computer network **in e.g. office, business establishment - has GUI which connects** task **in** task **list window and document in document list window according to operation on** displayed **operation** screen **which contains** task **and document list windows**
Patent Assignee: TOSHIBA KK (TOKE)
Number of Countries: 001 Number of Patents: 001
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
JP 11073459	A	19990316	JP 97235123	A	19970829	199921	B

Priority Applications (No Type Date): JP 97235123 A 19970829
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
JP 11073459	A		10	G06F-017/60	

Work flow management system for client- server computer network **in e.g. office, business establishment...**
...has GUI which connects task **in** task **list window and document in document list window according to operation on** displayed **operation** screen **which contains** task **and document list windows**

...Abstract (Basic): NOVELTY - A graphical user interface (GUI) connects a **task** in a **task** list window showing the list of the **tasks** for performing a series of occupation required for a service process, and a document in...

...list of documents, according to the operation of a document amendment/deletion module (121a) which **displays** an operation **screen** containing the **task** and document list windows. DETAILED DESCRIPTION - The document amendment/deletion module is included in each client **computer** (121-12N) connected to a **server computer** (11), which has a work flow management **server software** (111) **stored** in a database (112) and a repository file (113), through **LAN** (10). An INDEPENDENT CLAIM is also included for a document management operation method used by...

...USE - For client- **server computer network** in e.g. office, business establishment...
...figure shows a block diagram showing the structure of the work flow management system. (11) **Server computer** ; (121-12N) Client **computers** ; (111) Work flow management **server software** ; (112) Database; (113) Repository file; (121a) Document amendment/deletion module...
...Title Terms: **COMPUTER** ;
International Patent Class (Main): **G06F-017/60**
International Patent Class (Additional): **G06F-003/14**

30/3,K/19 (Item 19 from file: 350)
DIALOG(R)File 350:Derwent WPIX
(c) 2004 Thomson Derwent. All rts. reserv.

011935546 **Image available**
WPI Acc No: 1998-352456/199831
XRPX Acc No: N98-275582
Communication conference **system using PC - includes** several terminals **which display** same application and software **icon on** screen display device **based on detected common application capability** stored **in their** memory
Patent Assignee: CANON KK (CANO)
Number of Countries: 001 Number of Patents: 001
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
JP 10133984	A	19980522	JP 96292131	A	19961101	199831	B

Priority Applications (No Type Date): JP 96292131 A 19961101
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
JP 10133984	A		5	G06F-013/00	

Communication conference **system using PC**...

...**includes** several terminals **which display same application and** software **icon on** screen display device **based on detected common application capability** stored **in their** memory

...Abstract (Basic): The system includes **several terminals** (10A-10C) which are connected through a communication **network** (12) for holding a **conference** . A transmitting side **terminal** has an application detector which detects the application capability of its own **terminal** and transmits a file extension to a receiving side **terminal** . The receiving side **terminal** detects its own application capability and compares it with the received application capability...

...The receiving side **terminal** detects a common application capability and **stores** it in its **memory** . The receiving side **terminal** transmits the detected common application capability to the transmitting side **terminal** . Both the **terminals** display the icon of the application and **software** belonging to the common application capability on the **screen** of a **display device** (16...
...Title Terms: **TERMINAL** ;
International Patent Class (Main): **G06F-013/00**
International Patent Class (Additional): **G06F-009/06** ...

... **G06F-015/00**

30/3,K/63 (Item 63 from file: 347)
DIALOG(R)File 347:JAPIO

06471172 **Image available**
ELECTRONIC **CONFERENCE** SYSTEM BY MEANS OF WHITE BOARD USING PEN-INPUT LARGE **SCREEN** **DISPLAY** AND **SCREEN** SHARING **SOFTWARE**

PUB. NO.: 2000-056747 [JP 2000056747 A]
PUBLISHED: February 25, 2000 (20000225)
INVENTOR(s): KUBONOYA HIDEAKI
APPLICANT(s): NEC CORP
APPL. NO.: 10-229211 [JP 98229211]
FILED: August 14, 1998 (19980814)

ELECTRONIC **CONFERENCE** SYSTEM BY MEANS OF WHITE BOARD USING PEN-INPUT LARGE **SCREEN** **DISPLAY** AND **SCREEN** SHARING **SOFTWARE**

INTL CLASS: G09G-005/00; **G06F-003/00** ; **G06F-013/00** ; H04N-001/00

ABSTRACT

PROBLEM TO BE SOLVED: To provide an electronic **conference** system and an electronic **conference** method capable of **reducing** physical resources and personal resources.

SOLUTION : This electronic **conference** system is provided with a large-sized display 1, an electronic pen 2 directly writing on the large-sized display 1, a first personal **computer** 3 operating exclusive application provided with a **server** function and a small-sized display 3a connected to the **computer** 3 and a second personal **computer** 4 connected to the **computer** 3 through an **LAN** 7 and the small-sized display 4a connected to the **computer** 4. By the dedicated application makes, a common picture including the proceedings contents entered by...

... the large-sized, small-sized displays 1, 3a, 4a, and this picture is electronized and **stored** .

30/3,K/69 (Item 69 from file: 347)
DIALOG(R)File 347:JAPIO

05271904 **Image available**
EXECUTION **TASK** ARRANGING DEVICE

PUB. NO.: 08-227404 [JP 8227404 A]
PUBLISHED: September 03, 1996 (19960903)
INVENTOR(s): UMETSU HIDEAKI
APPLICANT(s): MATSUSHITA ELECTRIC IND CO LTD [000582] (A Japanese Company or Corporation), JP (Japan)
APPL. NO.: 07-031218 [JP 9531218]
FILED: February 20, 1995 (19950220)

EXECUTION **TASK** ARRANGING DEVICE

INTL CLASS: **G06F-015/16**
...JAPIO CLASS: **Computer** Applications)

ABSTRACT

PURPOSE: To provide the execution **task** arranging device with superior operability and processing performance which effectively utilizes resources and improves the throughput by performing optimum **task** allocation according to the use state and processing performance of plural **computers** in **network** environment...

...CONSTITUTION: The execution **task** arranging device 1, equipped with a **central processor** 2, a **display device** 3, a main **storage** device 6, and a secondary **storage** device 5 in the **network** environment wherein the **computers** are connected, is equipped with an execution **task** arrangement control part 7 which allocates execution **tasks** from a **computer** which has a free execution time of **software** within a specific time and an application **software** operation number table 8 which contains the items of operation time ratios of the **computer** identification numbers and application **software** of the respective **computers** and/or the processing speed ratio of the **computers** .

30/3,K/70 (Item 70 from file: 347)
DIALOG(R)File 347:JAPIO

05124226 **Image available**
ELECTRONIC **CONFERENCE** SYSTEM FOR SUPPORTING COOPERATIVE OPERATION

PUB. NO.: 08-079726 [JP 8079726 A]
PUBLISHED: March 22, 1996 (19960322)
INVENTOR(s): KUWANA EIJI
NAKAMURA YUZO
SAKAMOTO YASUHISA
YANA EIJI
KITAYAMA TETSUYA
WADA KAZUYA
ADACHI MAKI
APPLICANT(s): NIPPON TELEGR & TELEPH CORP <NTT> [000422] (A Japanese Company or Corporation), JP (Japan)
UCHIDA YOKO CO LTD [324958] (A Japanese Company or Corporation), JP (Japan)
APPL. NO.: 06-215841 [JP 94215841]
FILED: September 09, 1994 (19940909)

ELECTRONIC **CONFERENCE** SYSTEM FOR SUPPORTING COOPERATIVE OPERATION
INTL CLASS: H04N-007/15; **G06F-003/14** ; **G06F-013/00** ; **G06F-015/00** ; H04L-012/18
...JAPIO CLASS: **Memory** Units); 45.3 (INFORMATION PROCESSING...

... **Computer** Applications)

ABSTRACT

PURPOSE: To smoothly advance a **conference** by arbitrarily distributing the plural pieces of video information to plural **display devices** and **displaying** the same information on respective monitors...

...CONSTITUTION: The information from a video **conference** equipment controller 107 is displayed on a large-size shared screen 122. the information of **computers** 117 for **conference** participants is **displayed** on the **screen** 122 and the monitors 116 for the **conference** participants and output to a video information recording/ output device 112 is performed. Also, since...

... respective monitors 116 by RGB signals from a video information controller 113, in this electronic **conference** system, the video information is shared in the **conference** at a high speed compared to the case of sharing the video information by a **computer network** and the application **software** . The controller 113 is set from a distribution instruction device 115 and the voice information...

...device 108 and transmitted to the opposite party through a CODEC 106 for a video **conference** and the **conference** is advanced smoothly.

```
Set      Items   Description
S1          31   AU=(YUKIO M? OR YUKIO, M? OR YASUO H? OR YASUO, H? OR TOSH-
                 IMICHI M? OR TOSHIMICHI, M?)
S2           0   MINEGISHI(2W)YUKIO OR HARADA(2W)YASUO OR MATSUZAKI(2W)TOSH-
                 IMICHI
S3       37693   BRAINSTORM? OR HASH()SESSION? OR CONFERENC? OR TELECONFER?
                 OR VIDEOCONFER? OR MEETING? OR COMMITTEE? OR BRAIN()STORM? OR
                 PROBLEM()SOLVING
S4     1161308   IC=(G09B? OR G06F? OR G06N?)
S5           1   S1:S2 AND S3:S4
? show files
File 347:JAPIO Nov 1976-2004/Mar(Updated 040708)
         (c) 2004 JPO & JAPIO
File 350:Derwent WPIX 1963-2004/UD,UM &UP=200445
         (c) 2004  Thomson Derwent
```

← 0.

SIGNIFICANT HITS AFTER REVIEW

```
Set     Items   Description
S1          6   AU=(YUKIO M? OR YUKIO, M? OR YASUO H? OR YASUO, H? OR TOSH-
              IMICHI M? OR TOSHIMICHI, M?)
S2         44   MINEGISHI(2W)YUKIO OR HARADA(2W)YASUO OR MATSUZAKI(2W)TOSH-
              IMICHI
S3      89277   BRAINSTORM? OR HASH()SESSION? OR CONFERENC? OR TELECONFER?
              OR VIDEOCONFER? OR MEETING? OR COMMITTEE? OR BRAIN()STORM? OR
              PROBLEM()SOLVING
S4     132175   IC=(G09B? OR G06F? OR G06N?)
S5         16   S1:S2 AND S3:S4
S6         16   IDPAT (sorted in duplicate/non-duplicate order)
? show files
File 348:EUROPEAN PATENTS 1978-2004/Jul W02
         (c) 2004 European Patent Office
File 349:PCT Fulltext 1979-2002/UB=20040708,UT=20040701
         (c) 2004 WIPO/Univentio
```

6/3,AU/1 **(Item 1 from file: 348)**
DIALOG(R)File 348:EUROPEAN PATENTS

01520741
Data processing apparatus
Datenverarbeitungsvorrichtung
Dispositif de traitement de donnees
PATENT ASSIGNEE:
MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD., (216882), 1006, Kadoma, Kadoma-shi, Osaka-fu 571, (JP), (Applicant designated States: all)
INVENTOR:
Matsuzaki , Toshimichi , 1-6-7-803, Nishi, Aomadani, Mino-shi, Osaka 562, (JP)
Deguchi, Masashi, 3-7-31, Kitatomigaoka, Nara-shi, Nara 631, (JP
LEGAL REPRESENTATIVE:
Ahmad, Sheikh Shakeel et al (85132), David Keltie Associates Fleet Place House 2 Fleet Place, London EC4M 7ET, (GB)
PATENT (CC, No, Kind, Date): EP 1271305 A1 030102 (Basic)
APPLICATION (CC, No, Date): EP 2002078385 920820;
PRIORITY (CC, No, Date): JP 91209112 910821
DESIGNATED STATES: DE; FR; GB; NL
RELATED PARENT NUMBER(S) - PN (AN):
EP 984358 (EP 99124426)
EP 528695 (EP 92307632)
INTERNATIONAL PATENT CLASS: **G06F-009/30**
ABSTRACT WORD COUNT: 72
NOTE:
Figure number on first page: 4A
LANGUAGE (Publication,Procedural,Application): English; English; English

6/3,AU/2 **(Item 2 from file: 348)**
DIALOG(R)File 348:EUROPEAN PATENTS

01132091
Data processing apparatus
Datenverarbeitungsvorrichtung
Appareil de traitement de donnees
PATENT ASSIGNEE:
MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD., (216883), 1006, Oaza-Kadoma, Kadoma-shi, Osaka 571-8501, (JP), (Proprietor designated states: all)
INVENTOR:
Matsuzaki , Toshimichi , 1-6-7-803, Nishi, Aomadani Mino-shi, Osaka 562 , (JP)
Deguchi, Masashi, 3-7-31, Kitatomigaoka, Nara-shi, Nara 631, (JP
LEGAL REPRESENTATIVE:
Ahmad, Sheikh Shakeel et al (85131), David Keltie Associates Fleet Place House 2 Fleet Place, London EC4M 7ET, (GB)
PATENT (CC, No, Kind, Date): EP 989485 A2 000329 (Basic)
EP 989485 A3 000823
EP 989485 B1 040102
APPLICATION (CC, No, Date): EP 99124499 920820;
PRIORITY (CC, No, Date): JP 91209112 910821
DESIGNATED STATES: DE; FR; GB; NL
RELATED PARENT NUMBER(S) - PN (AN):
EP 528695 (EP 92307632)
INTERNATIONAL PATENT CLASS: **G06F-009/30 ; G06F-009/318**
ABSTRACT WORD COUNT: 72

NOTE:
  Figure number on first page: 1
LANGUAGE (Publication,Procedural,Application): English; English; English
FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS A	(English)	200013	693
CLAIMS B	(English)	200401	241
CLAIMS B	(German)	200401	202
CLAIMS B	(French)	200401	271
SPEC A	(English)	200013	3299
SPEC B	(English)	200401	3220
Total word count - document A			3993
Total word count - document B			3934
Total word count - documents A + B			7927

6/3,AU/3 (Item 3 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS

01125953
Data processing apparatus
Datenverarbeitungsvorrichtung
Appareil de traitement de donnees
PATENT ASSIGNEE:
  MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD., (216883), 1006, Oaza Kadoma, Kadoma-shi, Osaka-fu, 571, (JP), (Applicant designated States: all)
INVENTOR:
  Matsuzaki , Toshimichi , 1-8-7-803, Nishi, Aomadani, Mino-shi, Osaka 562, (JP)
  Deguchi, Masashi, 3-7-31, Kitatomigaoka, Nara-shi, Nara 631, (JP
LEGAL REPRESENTATIVE:
  Ahmad, Sheikh Shakeel et al (85131), David Keltie Associates, 12 New Fetter Lane, London EC4A 1AP, (GB)
PATENT (CC, No, Kind, Date): EP 984358 A2 000308 (Basic)
EP 984358 A3 001206
APPLICATION (CC, No, Date): EP 99124426 920820;
PRIORITY (CC, No, Date): JP 91209112 910821
DESIGNATED STATES: DE; FR; GB; NL
RELATED PARENT NUMBER(S) - PN (AN):
  EP 528695 (EP 92307632)
RELATED DIVISIONAL NUMBER(S) - PN (AN):
  (EP 2002078385)
INTERNATIONAL PATENT CLASS: **G06F-009/30**
ABSTRACT WORD COUNT: 72
NOTE:
  Figure number on first page: 1
LANGUAGE (Publication,Procedural,Application): English; English; English
FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS A	(English)	200010	1298
SPEC A	(English)	200010	3252
Total word count - document A			4550
Total word count - document B			0
Total word count - documents A + B			4550

6/3,AU/4 (Item 4 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS

00543158
Data processing apparatus
Datenverarbeitungsvorrichtung
Appareil de traitement de donnees
PATENT ASSIGNEE:
MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD., (216883), 1006, Oaza Kadoma, Kadoma-shi, Osaka-fu, 571, (JP), (Proprietor designated states: all)
INVENTOR:
Matsuzaki , Toshimichi , 1-6-7-803, Nishi, Aomadani, Mino-shi, Osaka 562, (DE)
Deguchi, Masashi, 3-7-31, Kitatomigaoka, Nara-shi, Nara 631, (DE
LEGAL REPRESENTATIVE:
Keltie, David Arthur (32533), DAVID KELTIE ASSOCIATES, 12 New Fetter Lane , London EC4A 1AP, (GB)
PATENT (CC, No, Kind, Date): EP 528695 A2 930224 (Basic)
EP 528695 A3 940824
EP 528695 B1 000712
APPLICATION (CC, No, Date): EP 92307632 920820;
PRIORITY (CC, No, Date): JP 91209112 910821
DESIGNATED STATES: DE; FR; GB; NL
RELATED DIVISIONAL NUMBER(S) - PN (AN):
EP 984358 (EP 99124426)
EP 989485 (EP 99124499)
INTERNATIONAL PATENT CLASS: **G06F-009/30**
ABSTRACT WORD COUNT: 73
NOTE:
Figure number on first page: NONE
LANGUAGE (Publication,Procedural,Application): English; English; English
FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS B	(English)	200028	388
CLAIMS B	(German)	200028	341
CLAIMS B	(French)	200028	451
SPEC B	(English)	200028	3449
Total word count - document A			0
Total word count - document B			4629
Total word count - documents A + B			4629

6/3,AU/5 (Item 5 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS

01338169
Microprocessor for supporting reduction of program codes in size
Mikroprozessor mit reduzierten Programmcodes
Microprocesseur avec codes de programme reduits
PATENT ASSIGNEE:
MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD., (1855503), 1006, Oaza Kadoma, Kadoma-shi, Osaka 571, (JP), (Applicant designated States: all)
INVENTOR:
Matsuzaki , Toshimichi , 1-6-7803, Nishi, Aomadani, Mino-shi, Osaka 562 , (JP)
Deguchi, Masashi, 3-7-31, Kitatomigaoka, Nara-shi, Nara 631, (JP)
Hamaguchi, Toshifumi, 3-19-21, Ankouji-cho, Takatsuki-shi, Osaka 569, (JP)
Tanase, Yutaka, 42-14-2-120, Koaza-Hanshowari, Oazal-Kusauchi, Tanabe-cho, Tsuuzuki-gun, (JP)
Matsumoto, Masahiko, 15-5-C, Ninotsubo, Shouryu-ji, Nagaokakyo-shi, Kyoto 617, (JP

LEGAL REPRESENTATIVE:
  Butcher, Ian James et al (79251), A.A. Thornton & Co. 235 High Holborn, London WC1V 7LE, (GB)
PATENT (CC, No, Kind, Date): EP 1143333 A2 011010 (Basic)
EP 1143333 A3 011031
APPLICATION (CC, No, Date): EP 2001111215 960530;
PRIORITY (CC, No, Date): JP 95133281 950531; JP 95134078 950531
DESIGNATED STATES: DE; GB; NL
RELATED PARENT NUMBER(S) - PN (AN):
  EP 745932 (EP 96303914)
INTERNATIONAL PATENT CLASS: **G06F-009/34**
ABSTRACT WORD COUNT: 114
NOTE:
  Figure number on first page: 3
LANGUAGE (Publication,Procedural,Application): English; English; English
FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS A	(English)	200141	652
SPEC A	(English)	200141	12833
Total word count - document A			13485
Total word count - document B			0
Total word count - documents A + B			13485

6/3,AU/6 (Item 6 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS

00802349
Microprocessor supporting variable length instruction execution
Mikroprozessor zur Ausfuhrung von Befehlen mit variablen Langen
Microprocesseur capable d'executer des instructions de longueur variable
PATENT ASSIGNEE:
  MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD., (216885), 1006, Oaza Kadoma, Kadoma-shi, Osaka 571-0050, (JP), (Proprietor designated states: all)
INVENTOR:
  Matsuzaki , Toshimichi , 1-6-7-803, Nishi, Aomadani, Mino-shi, Osaka 562, (JP)
  Deguchi, Masashi, 3-7-31, Kitatomigaoka, Nara-shi, Nara 631, (JP)
  Hamaguchi, Toshifumi, 3-19-21, Ankouji-cho, Takatsuki-shi, Osaka 569, (JP)
  Tanase, Yutaka, 42-14-2-120, Koaza-Hanshowari, Oazal-Kusauchi, Tanabe-cho, Tsuzuki-gun, (JP)
  Matsumoto, Masahiko, 15-5-C, Ninotsubo, Shouryu-ji, Nagaokakyo-shi, Kyoto 617, (JP
LEGAL REPRESENTATIVE:
  Crawford, Andrew Birkby et al (29761), A.A. Thornton & Co. 235 High Holborn, London WC1V 7LE, (GB)
PATENT (CC, No, Kind, Date): EP 745932 A2 961204 (Basic)
EP 745932 A3 980909
EP 745932 B1 031022
APPLICATION (CC, No, Date): EP 96303914 960530;
PRIORITY (CC, No, Date): JP 95133281 950531; JP 95134078 950531
DESIGNATED STATES: DE; GB; NL
RELATED DIVISIONAL NUMBER(S) - PN (AN):
  EP 1143333 (EP 2001111215)
INTERNATIONAL PATENT CLASS: **G06F-009/30 ; G06F-009/34**
ABSTRACT WORD COUNT: 131
NOTE:
  Figure number on first page: NONE
LANGUAGE (Publication,Procedural,Application): English; English; English

FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS A	(English)	EPAB96	1531
CLAIMS B	(English)	200343	1105
CLAIMS B	(German)	200343	1108
CLAIMS B	(French)	200343	1337
SPEC A	(English)	EPAB96	12812
SPEC B	(English)	200343	12727
Total word count - document A			14345
Total word count - document B			16277
Total word count - documents A + B			30622

6/3,AU/7 (Item 7 from file: 348)

DIALOG(R)File 348:EUROPEAN PATENTS

01603526

METHODS FOR ENSURING MEDIUM ACCESS IN A WIRELESS NETWORK
VERFAHREN ZUM GARANTIERTEN MEDIUMZUGRIFF IN EINEN DRAHTLOSEN NETZWERK
PROCEDES POUR ASSURER L'ACCES A UN SUPPORT DANS UN RESEAU SANS FIL

PATENT ASSIGNEE:
MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD., (216883), 1006, Oaza-Kadoma, Kadoma-shi, Osaka 571-8501, (JP), (Applicant designated States: all)

INVENTOR:
TAN, Pek Yew, Block 128, Yishun Street 11, 05-305, 760128 Singapore, (SG)
LIM, Wei Lih, Block 512, Serangoon North Avenue 4, 06-422, 550512 Singapore, (SG)
OHMI, Shinichiro, 359-21, Shimotajiri, Nose-cho, Toyono-gun, Osaka 563-0123, (JP)
HARADA , **Yasuo** , 6-7-713, Takenodai, Nishi-ku, Kobe-shi, Hyogo 651-2274 , (JP

PATENT (CC, No, Kind, Date): WO 2003040866 030515
APPLICATION (CC, No, Date): EP 2002778070 021108; WO 2002JP11662 021108
PRIORITY (CC, No, Date): JP 2001344347 011109
DESIGNATED STATES: AT; BE; BG; CH; CY; CZ; DE; DK; EE; ES; FI; FR; GB; GR; IE; IT; LI; LU; MC; NL; PT
EXTENDED DESIGNATED STATES: AL; LT; LV; MK; RO; SI
INTERNATIONAL PATENT CLASS: **G06F-001/00**
LANGUAGE (Publication,Procedural,Application): English; English; English

6/3,AU/8 (Item 8 from file: 348)

DIALOG(R)File 348:EUROPEAN PATENTS

00788788

Multicarrier modulation receiver using remodulation
Mehrtragermodulationsempfanger mit Remodulation
Recepteur avec remodulation pour signaux a modulation multiporteuse

PATENT ASSIGNEE:
Matsushita Electric Industrial Co. Ltd., (3141015), 1006, Oazakadoma, Kadoma-shi Osaka-fu, (JP), (Proprietor designated states: all)

INVENTOR:
Kimura, Tomohiro, 30-1-708, Minamikibogaoka, Kawachinagano-shi- Osaka-fu, (JP)
Harada , **Yasuo** , 6-7-713, Takenodai, Nishi-ku, Kobe-shi, Hyogo-ken, (JP)

Hayashino, Hiroshi, 3-21-17, Kawamo, Takarazuka-shi, Hyogo-ken, (JP)
Uno, Yasuhiro, 4-9-105, Ikuno, Katano-shi, Osaka-fu, (JP
LEGAL REPRESENTATIVE:
Altenburg, Udo, Dipl.-Phys. et al (1269), Patent- und Rechtsanwalte Bardehle . Pagenberg . Dost . Altenburg . Geissler Postfach 86 06 20, 81633 Munchen, (DE)
PATENT (CC, No, Kind, Date): EP 735712 A2 961002 (Basic)
EP 735712 A3 010117
EP 735712 B1 040526
APPLICATION (CC, No, Date): EP 96104728 960325;
PRIORITY (CC, No, Date): JP 9567771 950327
DESIGNATED STATES: DE; FR; GB; NL
INTERNATIONAL PATENT CLASS: H04L-005/06
ABSTRACT WORD COUNT: 166
NOTE:
Figure number on first page: 1
LANGUAGE (Publication,Procedural,Application): English; English; English
FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS B	(English)	200422	790
CLAIMS B	(German)	200422	722
CLAIMS B	(French)	200422	1044
SPEC B	(English)	200422	2887
Total word count - document A			0
Total word count - document B			5443
Total word count - documents A + B			5443

6/3,AU/9 (Item 9 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS

00682371
Data processing apparatus handling plural divided interruptions
Datenverarbeitungsgerat zum Behandeln von mehreren, geteilten Unterbrechungen
Appareil de traitement de donnees pour prendre en charge une pluralite d'interruptions divisees
PATENT ASSIGNEE:
MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD., (216883), 1006, Oaza Kadoma, Kadoma-shi, Osaka-fu, 571, (JP), (applicant designated states: DE;FR;GB;NL)
INVENTOR:
Matsuzaki , Toshimichi , 1-6-7-803, Aomadani-nishi, Mino-shi, Osaka 562 , (JP)
Higaki, Nobuo, 4-15-26, Komatsu, Higashi-yodogawa-ku, Osaka-shi, Osaka 533, (JP
LEGAL REPRESENTATIVE:
Cummings, Sean Patrick et al (72881), David Keltie Associates, 12 New Fetter Lane, London EC4A 1AP, (GB)
PATENT (CC, No, Kind, Date): EP 652514 A2 950510 (Basic)
EP 652514 A3 950712
EP 652514 B1 990210
APPLICATION (CC, No, Date): EP 94308164 941104;
PRIORITY (CC, No, Date): JP 93276756 931105
DESIGNATED STATES: DE; FR; GB; NL
INTERNATIONAL PATENT CLASS: **G06F-009/46**
ABSTRACT WORD COUNT: 190
LANGUAGE (Publication,Procedural,Application): English; English; English
FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS B	(English)	9906	1172
CLAIMS B	(German)	9906	992
CLAIMS B	(French)	9906	1350
SPEC B	(English)	9906	9937
Total word count - document A			0
Total word count - document B			13451
Total word count - documents A + B			13451

6/3,AU/10 (Item 10 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS

00601001
Data processing apparatus with improved data throughput
Datenverarbeitungsgerat mit verbessertem Datendurchfluss
Appareil de traitement de donnees avec debit de donnees ameliore
PATENT ASSIGNEE:
MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD., (216883), 1006, Oaza Kadoma, Kadoma-shi, Osaka-fu, 571, (JP), (Proprietor designated states: all)
INVENTOR:
Higaki, Nobuo, 4-15-26-2H, Komatsu, Higashi-Yodogawa-ku, Osaka-shi, Osaka 533, (JP)
Matsuzaki , Toshimichi , 1-6-7-803, Aomadani-Nishi, Minou-shi, Osaka 562, (JP
LEGAL REPRESENTATIVE:
Cummings, Sean Patrick et al (72881), David Keltie Associates, 12 New Fetter Lane, London EC4A 1AP, (GB)
PATENT (CC, No, Kind, Date): EP 588607 A1 940323 (Basic)
EP 588607 B1 991222
APPLICATION (CC, No, Date): EP 93307260 930915;
PRIORITY (CC, No, Date): JP 92246659 920916
DESIGNATED STATES: DE; FR; GB; NL
INTERNATIONAL PATENT CLASS: **G06F-015/78 ; G06F-013/28 ; G06F-013/40**
ABSTRACT WORD COUNT: 169
NOTE:
Figure number on first page: 3
LANGUAGE (Publication,Procedural,Application): English; English; English
FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS B	(English)	199951	3655
CLAIMS B	(German)	199951	3267
CLAIMS B	(French)	199951	4191
SPEC B	(English)	199951	12728
Total word count - document A			0
Total word count - document B			23841
Total word count - documents A + B			23841

6/3,AU/11 (Item 11 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS

00459399
Low power consumption microprocessor.
Mikroprozessor mit niedrigem Leistungsverbrauch.
Microprocesseur a basse consommation d'energie.
PATENT ASSIGNEE:
MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD., (216883), 1006, Oaza Kadoma,

Kadoma-shi, Osaka-fu, 571, (JP), (applicant designated states: DE;FR;GB;NL)
INVENTOR:
Matsuzaki , Toshimichi , 1-6-7-803, Aomadani Nishi, Mino-shi, Osaka-fu, (JP)
Deguchi, Masashi, 3-7-31, Kitatomigaoka, Nara-shi, Nara-ken, (JP
LEGAL REPRESENTATIVE:
Eisenfuhr, Speiser & Partner (100151), Martinistrasse 24, D-28195 Bremen, (DE)
PATENT (CC, No, Kind, Date): EP 451661 A2 911016 (Basic)
EP 451661 A3 930120
EP 451661 B1 950719
APPLICATION (CC, No, Date): EP 91105133 910330;
PRIORITY (CC, No, Date): JP 9086507 900330
DESIGNATED STATES: DE; FR; GB; NL
INTERNATIONAL PATENT CLASS: **G06F-001/32 ; G06F-001/08**
ABSTRACT WORD COUNT: 58
LANGUAGE (Publication,Procedural,Application): English; English; English
FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS A	(English)	EPABF1	327
CLAIMS B	(English)	EPAB95	346
CLAIMS B	(German)	EPAB95	293
CLAIMS B	(French)	EPAB95	384
SPEC A	(English)	EPABF1	3032
SPEC B	(English)	EPAB95	3026
Total word count - document A			3359
Total word count - document B			4049
Total word count - documents A + B			7408

6/3,AU/12 (Item 12 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS

00373153
Data processor with zero execution clock count for conditional branch instruction
Datenprozessor mit Null-Ausfuhrungszyklus fur einen bedingten Sprung-Befehl
Processeur de donnees avec un nombre de cycles d'execution nul pour branchement conditionel
PATENT ASSIGNEE:
MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD., (216883), 1006, Oaza Kadoma, Kadoma-shi, Osaka-fu, 571, (JP), (applicant designated states: DE;FR;GB;NL)
INVENTOR:
Suzuki, Masato, 5-2, Asahigaoka-3-chome, Ikeda-shi, (JP)
Deguchi, Masashi, 7-31 Kitatomigaoka-3-chome, Nara-shi, (JP)
Nishikawa, Yukinobu, 1-3-307 Toyosato-2-chome, Higashiyodogawa-ku Osaka-shi, (JP)
Matsuzaki , Toshimichi , 6-11-202, Aomataninishi-2-chome, Minoo-shi, (JP)
Miyazaki, Masaya, 5-5-452, Okakaminocho-2-chome, Toyonaka-shi, (JP)
Sakao, Takashi, 4-21, Minamikasugaoka-5-chome, Ibaraki-shi, (JP
LEGAL REPRESENTATIVE:
Smith, Norman Ian et al (36041), F.J. CLEVELAND & COMPANY 40-43 Chancery Lane, London WC2A 1JQ, (GB)
PATENT (CC, No, Kind, Date): EP 375364 A2 900627 (Basic)
EP 375364 A3 920610
EP 375364 B1 971008

APPLICATION (CC, No, Date): EP 89313289 891219;
PRIORITY (CC, No, Date): JP 88322631 881221
DESIGNATED STATES: DE; FR; GB; NL
INTERNATIONAL PATENT CLASS: **G06F-009/38**
ABSTRACT WORD COUNT: 272
LANGUAGE (Publication,Procedural,Application): English; English; English
FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS B	(English)	9710W1	515
CLAIMS B	(German)	9710W1	453
CLAIMS B	(French)	9710W1	551
SPEC B	(English)	9710W1	5279
Total word count - document A			0
Total word count - document B			6798
Total word count - documents A + B			6798

6/3,AU/13 (Item 13 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS

00372487
Cache device for supplying a fixed word length of a variable length instruction code and instruction fetch device
Cachespeicheranlage zum Versorgen eines Festworts eines Befehlscodes mit **variabler Lange und Befehlsabrufanlage**
Dispositif de memoire cache pour fournir un mot de longueur fixe d'une instruction de longueur variable et dispositif d'extraction d'instruction
PATENT ASSIGNEE:
MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD., (216883), 1006, Oaza Kadoma, Kadoma-shi, Osaka-fu, 571, (JP), (applicant designated states: DE;FR;GB;NL)
INVENTOR:
Suzuki, Masato, 5-2, Asahigaoka-3-chome, Ikeda-shi, (JP)
Deguchi, Masashi, 7-31, Kitatomigaoka-3-chome, Nara-shi, (JP)
Sakao, Takashi, 4-21, Minamikasugaoka-5-chome, Ibaraki-shi, (JP)
Matsuzaki , Toshimichi , 6-11-202, Aomataninishi-2-chome, Minoo-shi, (JP
LEGAL REPRESENTATIVE:
Smith, Norman Ian et al (36041), fJ CLEVELAND 40-43 Chancery Lane, London WC2A 1JQ, (GB)
PATENT (CC, No, Kind, Date): EP 372865 A2 900613 (Basic)
EP 372865 A3 910417
EP 372865 B1 980708
APPLICATION (CC, No, Date): EP 89312582 891201;
PRIORITY (CC, No, Date): JP 88307362 881205
DESIGNATED STATES: DE; FR; GB; NL
INTERNATIONAL PATENT CLASS: **G06F-012/08 ; G06F-009/38**
ABSTRACT WORD COUNT: 499
LANGUAGE (Publication,Procedural,Application): English; English; English
FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS B	(English)	9828	1245
CLAIMS B	(German)	9828	1034
CLAIMS B	(French)	9828	1612
SPEC B	(English)	9828	10430
Total word count - document A			0
Total word count - document B			14321
Total word count - documents A + B			14321

6/3,AU/14 (Item 14 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS

00368121
Data processing apparatus for performing parallel decoding and parallel execution of a variable word length instruction
Datenverarbeitungsgerat zur parallelen Dekodierung und parallelen Ausfuhrung von Befehlen mit variabler Wortlange
Dispositif de traitement de donnees realisant le decodage en parallele et l'execution en parallele d'une instruction a longueur de mot variable
PATENT ASSIGNEE:
MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD., (216883), 1006, Oaza Kadoma, Kadoma-shi, Osaka-fu, 571, (JP), (applicant designated states: DE;FR;GB;NL)
INVENTOR:
Matsuzaki , Toshimichi , 6-11-202, Aomataninishi-2-chome, Minoo-shi, (JP)
Sakao, Takashi, 4-21 Minamikasugaoka-5-chome, Ibaraki-shi, (JP
LEGAL REPRESENTATIVE:
Smith, Norman Ian et al (36041), F.J. CLEVELAND & COMPANY 40-43 Chancery Lane, London WC2A 1JQ, (GB)
PATENT (CC, No, Kind, Date): EP 354740 A2 900214 (Basic)
EP 354740 A3 910717
EP 354740 B1 960619
APPLICATION (CC, No, Date): EP 89307961 890804;
PRIORITY (CC, No, Date): JP 88198226 880809; JP 8928184 890207
DESIGNATED STATES: DE; FR; GB; NL
INTERNATIONAL PATENT CLASS: **G06F-009/38**
ABSTRACT WORD COUNT: 120
LANGUAGE (Publication,Procedural,Application): English; English; English
FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS A	(English)	EPABF1	564
CLAIMS B	(English)	EPAB96	536
CLAIMS B	(German)	EPAB96	525
CLAIMS B	(French)	EPAB96	632
SPEC A	(English)	EPABF1	3908
SPEC B	(English)	EPAB96	4016
Total word count - document A			4472
Total word count - document B			5709
Total word count - documents A + B			10181

6/3,AU/15 (Item 15 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS

00302096
Processing system for branch instruction
Verarbeitungssystem fur Verzweigungsbefehle
Systeme de traitement pour instructions de branchement
PATENT ASSIGNEE:
MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD., (216883), 1006, Oaza Kadoma, Kadoma-shi, Osaka-fu, 571, (JP), (applicant designated states: DE;FR;GB;NL)
INVENTOR:
Kimura, Kozo, KBC Manshon 8-505, 8-21 Kayashimahon-machi, Neyagawa-shi

Osaka, (JP)
Kiyohara, Tokuzo, 3-10-1-1523, Abenosuji Abeno-ku, Osaka-shi Osaka, (JP)
Matsuzaki , **Toshimichi** , 6-11-202, Aomadani Nishi 2-chome, Minou-shi Osaka, (JP
LEGAL REPRESENTATIVE:
Manitz, Finsterwald & Partner (100614), Postfach 22 16 11, 80506 Munchen, (DE)
PATENT (CC, No, Kind, Date): EP 315995 A2 890517 (Basic)
EP 315995 A3 920205
EP 315995 B1 990127
APPLICATION (CC, No, Date): EP 88118764 881110;
PRIORITY (CC, No, Date): JP 87286065 871112; JP 87286066 871112
DESIGNATED STATES: DE; FR; GB; NL
INTERNATIONAL PATENT CLASS: **G06F-009/38**
ABSTRACT WORD COUNT: 116
LANGUAGE (Publication,Procedural,Application): English; English; English
FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS B	(English)	9904	524
CLAIMS B	(German)	9904	482
CLAIMS B	(French)	9904	578
SPEC B	(English)	9904	7293
Total word count - document A			0
Total word count - document B			8877
Total word count - documents A + B			8877

6/3,AU/16 (Item 16 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS

00110715
Simulator of fluid flow in field of flow entailing combustion or reaction.
Simulator fur fluide Stromungen auf dem Gebiet von Stromungen bei Verbrennungen oder Reaktionen.
Simulateur d'ecoulement de fluide dans le domaine des ecoulements lies a une combustion ou une reaction.
PATENT ASSIGNEE:
Nippon Furnace KOGYO KAISHA LTD., (575120), 33-7, 5-chome, Shiba, Minato-ku Tokyo, (JP), (applicant designated states: DE;FR;GB;NL)
INVENTOR:
Toshiaki, Hasegawa, 12-13-407, 4-Chome Honcho, Kawaguchi-shi Saitama-ken, (JP)
Yasuo, Hirose , 801-88, Kanagaya Asahi-ku, Yokohama-shi Kanagawa-ken, (JP
LEGAL REPRESENTATIVE:
Rees, David Christopher et al (47921), Kilburn & Strode 30 John Street, London WC1N 2DD, (GB)
PATENT (CC, No, Kind, Date): EP 109810 A2 840530 (Basic)
EP 109810 A3 851218
EP 109810 B1 890510
APPLICATION (CC, No, Date): EP 83306878 831110;
PRIORITY (CC, No, Date): JP 82196098 821110
DESIGNATED STATES: DE; FR; GB; NL
INTERNATIONAL PATENT CLASS: **G09B-023/12** ; G01F-001/00; G01P-005/20
ABSTRACT WORD COUNT: 275
LANGUAGE (Publication,Procedural,Application): English; English; English
?

DISREGARD

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Set     Items   Description
S1         28   AU=(YUKIO M? OR YUKIO, M? OR YASUO H? OR YASUO, H? OR TOSH-
               IMICHI M? OR TOSHIMICHI, M?)
S2          0   MINEGISHI(2W)YUKIO OR HARADA(2W)YASUO OR MATSUZAKI(2W)TOSH-
               IMICHI
S3    1109988   BRAINSTORM? OR HASH()SESSION? OR CONFERENC? OR TELECONFER?
              OR VIDEOCONFER? OR MEETING? OR COMMITTEE? OR BRAIN()STORM? OR
              PROBLEM()SOLVING
S4          0   S1:S2 AND S3
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File  65:Inside Conferences 1993-2004/Jul W3
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File  99:Wilson Appl. Sci & Tech Abs 1983-2004/Jun
         (c) 2004 The HW Wilson Co.
File 121:Brit.Education Index 1976-2004/Q2
         (c) 2004 British Education Index
File 233:Internet & Personal Comp. Abs. 1981-2003/Sep
         (c) 2003 EBSCO Pub.
File 256:SoftBase:Reviews,Companies&Prods. 82-2004/Jun
         (c)2004 Info.Sources Inc
File 437:Education Abstracts 1983-2004/Jun
         (c) 2004 The HW Wilson Co
File 474:New York Times Abs 1969-2004/Jul 19
         (c) 2004 The New York Times
File 475:Wall Street Journal Abs 1973-2004/Jul 19
         (c) 2004 The New York Times
File 583:Gale Group Globalbase(TM) 1986-2002/Dec 13
         (c) 2002 The Gale Group
?
```

```
Set     Items   Description
S1          8   AU=(YUKIO M? OR YUKIO, M? OR YASUO H? OR YASUO, H? OR TOSH-
             IMICHI M? OR TOSHIMICHI, M?)
S2          1   MINEGISHI(2W)YUKIO OR HARADA(2W)YASUO OR MATSUZAKI(2W)TOSH-
             IMICHI
S3   12246084   BRAINSTORM? OR HASH()SESSION? OR CONFERENC? OR TELECONFER?
             OR VIDEOCONFER? OR MEETING? OR COMMITTEE? OR BRAIN()STORM? OR
             PROBLEM()SOLVING
S4          0   S1:S2 AND S3
? show files
File   9:Business & Industry(R) Jul/1994-2004/Jul 19
         (c) 2004  The Gale Group
File  15:ABI/Inform(R) 1971-2004/Jul 19
         (c) 2004 ProQuest Info&Learning
File  16:Gale Group PROMT(R) 1990-2004/Jul 20
         (c) 2004 The Gale Group
File  20:Dialog Global Reporter 1997-2004/Jul 20
         (c) 2004 The Dialog Corp.
File  88:Gale Group Business A.R.T.S. 1976-2004/Jul 19
         (c) 2004 The Gale Group
File 141:Readers Guide 1983-2004/Jun
         (c) 2004 The HW Wilson Co
File 148:Gale Group Trade & Industry DB 1976-2004/Jul 20
         (c)2004 The Gale Group
File 160:Gale Group PROMT(R) 1972-1989
         (c) 1999 The Gale Group
File 275:Gale Group Computer DB(TM) 1983-2004/Jul 20
         (c) 2004 The Gale Group
File 436:Humanities Abs Full Text 1984-2004/Jun
         (c) 2004 The HW Wilson Co
File 476:Financial Times Fulltext 1982-2004/Jul 20
         (c) 2004 Financial Times Ltd
File 610:Business Wire 1999-2004/Jul 20
         (c) 2004 Business Wire.
File 613:PR Newswire 1999-2004/Jul 20
         (c) 2004 PR Newswire Association Inc
File 621:Gale Group New Prod.Annou.(R) 1985-2004/Jul 20
         (c) 2004 The Gale Group
File 624:McGraw-Hill Publications 1985-2004/Jul 15
         (c) 2004 McGraw-Hill Co. Inc
File 634:San Jose Mercury  Jun 1985-2004/Jul 19
         (c) 2004 San Jose Mercury News
File 636:Gale Group Newsletter DB(TM) 1987-2004/Jul 20
         (c) 2004 The Gale Group
File 810:Business Wire 1986-1999/Feb 28
         (c) 1999 Business Wire
File 813:PR Newswire 1987-1999/Apr 30
         (c) 1999 PR Newswire Association Inc
?
```

```
Set     Items   Description
S1      91017   BRAINSTORM? OR BRAIN()STORM? OR PROBLEM()(SOLVE? OR SOLVING
             OR SOLUTION?) OR HASH()SESSION? OR CONFERENC? OR MEETING? OR
             COMMITTEE? OR GROUPTHINK? OR GROUP()THINK? OR TELECONFER? OR -
             VIDEOCONFER?
S2     980763   THOUGHT()RESULT? OR IDEA? ? OR TACTIC? OR STRATEG? OR CONS-
             ENSUS? OR SOLUTION? OR RESOLUTION? OR RESOLV? OR DECISION? OR
             OBJECTIVE? OR TASK? OR AIM OR AIMS OR GOAL? ? OR ACCOMPLISH?
S3     370046   COMPUTER? OR MICROPROCESS? OR MICRO()PROCESS? OR DATA()PRO-
             CESS? OR WORD()PROCESS?
S4     367817   TERMINAL? OR SERVER? OR DESKTOP? OR DESK()(TOP OR TOPS) OR
             WORKSTATION? OR WORK()STATION?
S5      99067   CPU OR CENTRAL()PROCESS? OR PROCESS?()UNIT?
S6     113442   CRT OR CATHODE()RAY()TUBE? OR DISPLAY?(2N)(MEDIUM OR MEDIA
             OR DEVICE? OR APPARATUS? OR SCREEN?)
S7     654928   MEMORY? OR STORE? OR STORING OR STORAGE OR RAM
S8     253418   INTERNET? OR NETWORK? OR EMAIL? OR E()MAIL? OR LAN OR WAN -
             OR ETHERNET? OR INTRANET?
S9     189911   SOFTWARE? OR SOFT()WARE? OR SPREADSHEET? OR SPREAD()SHEET?
S10     93726   (SELECT? OR PARTICIP? OR SUBJECT? OR THOUGHT?)(3N)(CELL? OR
              UNIT? OR BLOCK?)
S11    250840   MATRIX? OR MATRIC? OR GRID? ? OR CIRCLE()GRAPH? OR FAN()SH-
             APE?
S12    678711   NARROW? OR ATTENUAT? OR FILTER? OR CULL? OR STREAMLIN? OR -
             STREAM()(LINE? OR LINING) OR PARE? OR PARING OR WHITTL? OR ED-
             IT??? OR REDACT? OR TRIM? OR PRUNE? OR PRUNING
S13   1442111   CONDENS? OR LIMIT? OR RESTRICT? OR REFIN? OR REDUC? OR DIS-
             TILL? OR BOIL?()DOWN OR ABBREVIAT?
S14    716428   RANK? OR SORT? OR HIERARCH? OR PRIORIT? OR CATEGORIZ? OR C-
             ATEGORIS?
S15    327438   COLOR? OR COLOUR?
S16   1199276   PLURALIT? OR MULTIPL? OR SEVERAL? OR MULTITUD? OR MORE()TH-
             AN()ONE OR "MORE THAN ONE" OR NUMEROUS? OR MANY
S17    132175   IC=(G09B? OR G06F? OR G06N?)
S18     68610   S1:S2 AND S3:S5 AND S6
S19     20956   S18 AND S17
S20     18360   S19 AND S7 AND S8:S9
S21      5681   S20 AND S10:S11
S22      1661   S21 AND S12:S14(5N)S1:S2
S23      1258   S22 AND S16(5N)S1:S6
S24      1020   S23 AND S8 AND S9
S25       219   S24 AND S10 AND S11
S26       119   S25 AND S1:S2 AND S3:S5(10N)S6
S27       119   IDPAT (sorted in duplicate/non-duplicate order)
? show files
File 348:EUROPEAN PATENTS 1978-2004/Jul W02
        (c) 2004 European Patent Office
File 349:PCT Fulltext 1979-2002/UB=20040708,UT=20040701
        (c) 2004 WIPO/Univentio
?
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27/3,K/106 (Item 106 from file: 349)
DIALOG(R)File 349:PCT Fulltext

00475572
METHOD FOR ORGANIZING INFORMATION
PROCEDE D'ORGANISATION D'INFORMATIONS
Patent Applicant/Assignee:
CULLISS Gary,
Inventor(s):
CULLISS Gary,
Patent and Priority Information (Country, Number, Date):
Patent: WO 9906924 A1 19990211
Application: WO 98US15109 19980722 (PCT/WO US9815109)
Priority Application: US 97904795 19970801
Designated States: AU BR CA CN IL JP MX RU AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE
Publication Language: English
Fulltext Word Count: 9142

Main International Patent Class: **G06F-017/30**
Fulltext Availability:
Detailed Description

English Abstract
...to organize the articles that match a search query. As millions of people use the **Internet** , type in millions of search queries, and display or select from the many articles available over the **Internet** , they rank the information available over the **Internet** through an evolutionary process. The invention includes additional embodiments which incorporate category key terms and...

French Abstract
...correspondant a une demande de recherche. Etant donne que des millions de personnes utilisent l' **Internet** , tapent par millions des demandes de recherche et affichent ou choisissent a partir des nombreux articles disponibles sur l' **Internet** , ils organisent les informations disponibles sur l' **Internet** , par l'intermediaire d'un processus evolutif. L'invention comprend des modes de realisation additionnels...

Detailed Description
METHOD FOR ORGANIZING INFORMATION
BACKGROUND OF THE INVENTION
Related Disclosures.

This patent application contains **subject** matter disclosed in **United** States Disclosure Document Numbers 411,887; 417,369 and 417,458.

Related Application.

This patent...

...organizing information by monitoring the search activity of users.

Description of the Prior Art.

The **Internet** is an extensive **network** of **computer** systems which allows a user to send and receive data between **computers** connected to this **network** . This data may include web sites, home pages, databases, text collections, audio, ideo or any other type of information made

available over the **Internet** (collectively referred to as "articles") from a
vi
computer **server** connected to the **Internet** . The articles may also include key terms representing selected portions of the information contained in the article. These key terms are available over the **Internet** to other **computers** and permit these other **computers** to locate the article.

To locate articles on the **Internet** , a user of a remote **computer** searches for the key terms using a search program known as a search engine. Examples of search engines currently available on the **Internet** include "Yahoo!" (TM), "Excite" (TM), and "AltaVista" (TM). These programs allow the remote user to...

...and select a desired article.

Conventional key word searching and various prior art methods of **accomplishing** such key word searching are disclosed in at least the following patents: U.S. Patent 5,588,060, entitled METHOD AND APPARATUS FOR A KEY-MANAGEMENT SCHEME FOR **INTERNET** PROTOCOLS; U.S. Patent 5,546,390, entitled METHOD AND APPARATUS FORRADIXDECISIONPACKETPROCESSING;U.S. Patent5,528,757, entitledROUTING SYSTEM FOR RETRIEVING REQUESTED PROGRAM BY DISCARDING RECEIVED PROGRAM IDENTICAL WITH **STORED** PROGRAMS AND TRANSFERRING THE RECEIVED PROGRAM NOT IDENTICAL WITH **STORED** PROGRAMS; U.S. Patent 5,377,355, entitled METHOD AND APPARATUS FOR AUTOMATED PROCEDURE INITIATION IN A **DATA PROCESSING** SYSTEM INCLUDING SOLICITING AN EVALUATION VOTE FROM USERS AUTOMATICALLY DETERMINED IN RESPONSE TO IDENTIFICATION OF...INPUT QUERY; U.S. Patent 5,408,586, entitled HISTORICAL DATABASE TRAINING METHOD FOR NEURAL **NETWORKS** ; U.S. Patent 5,408,655, entitled USER INTERFACE SYSTEM
I
AND I@ETHOD FOR...

...5,185,888, entitled NETHOD AND APPARATUS FOR DATA NIERGING/SORTING AND SEARCMNG USING A **PLURALITY** OF BIT-SLICED PROCESSING UNITS ; and U.S. Patent 4,967,341, entitled NETHOD AND APPARATUS FOR PROCESSING DATA BASE.

A person who places an article on the **Internet** typically intends for it to be available to all people who type in searchtermsthatareevenremotelyrelatedtothesubjectmatteroftheearticle. Thisinereasestheexposureofthearticle to the public searching the **Internet** . Such increased exposure can potentially increase product sales or advertising revenue for the owner of...
...matter which the user desires to find through a combination of search terms.

Further, some **Internet** users are not skilled in selecting and connecting key word search queries. These users will...

...find the desired information or advertisement.

As the total number of articles posted on the **Internet** continues to increase, there is an 'increasing number of articles retrieved with each search query...

...UWENTION
Accordingly, it is an object of the invention to organize articles available on the **Internet** .

It is another object of the present invention to monitor searching activity to organize articles in accordance with the searching activity of one or more users.

To **accomplish** these and other objects, the present invention generally comprises a method of organizing information in...

...match a search query. The method allows the search activity of a large number of **Internet** users to organize the information available over the **Internet** through an evolutionary process.

This brief description sets forth rather broadly the more important features...from the spirit and scope of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The **Internet** is an extensive **network** of **computer** systems which allows a user to connect with various **computer servers** or systems. The **Internet** pen-nits users to send and receive data between the **computers** connected to this **network** .

The data can be read, viewed or listened to on a browser or other **software** program from over the **Internet** on a remote user's **computer** . This data may comprise articles, databases, data collections, web sites, web pages, graphics, encryption, audio...

...maintains an 'index of key words, terms, data or identifiers in English or other languages, **computer** code, or encryption which are collectively referred to as key terms and represented herein by...retrieving, reading, viewing, listening to or otherwise closely inspecting the article from 3
over the **Internet** or from any other **storage** area. The matched article selected by the user is called the selected matched article.

Once...position to article Al because the comparison score for matched article A3 is higher.

Increased **Resolution** .

To provide for increased **resolution** in search **ranking** , the index may include matching associations of two or more key terms. For example, in ...

...below, each key term is grouped with one or more other key ternis in a **matrix** format. Single key terms can be represented by a grouping of identical terms. Using the...listed in the boxes formed at the intersectim of the rows and columns of the **matrix** to indicate that such articles are associated with the intersecting key terms. Although the index...that articles wlrich are downloaded by persons authorized to access X-rated articles cannot be **e - mailed** to persons not authorized to receive such articles. In other words, the **e - mail** browser could have **software** incorporated therein which checks the rating key term score of any attached articles and screens...

...the predetermined threshold.

Implementation.

The present invention is intended to operate in any form of **networked** or stand alone **computer** or **computer** system. For instance, the program can be run on a **server** connected to the **Internet** . A user having a remote **computer** connected to the **Internet** can access the program over

the **Internet** via a browser or other program and enter a search query from the remote site. The program on the **server** can generate a list of matched articles, by any method such as described herein, and...

...a list of squibs, such as hypertext links or other article identifiers to the remote **computer** for **display** on the **screen** . The user can then select one of the articles by "clicking" on the squib or...

...and is specifically meant the positioning an electronic pointer on the squib of the article **displayed** on the **screen** via a mouse or other pointing device and operating the button or switch of the...
...portion thereof.

If the squib is a hypertext link, then the browser of the remote **computer** will retrieve the data of the article from the **server** URL indicated by the hypertext link. Before or after accessing the article URL through the hypertext link, the remote **computer** can send a data packet to the search **server** to indicate which matched article the user selected. As a user selects an article, the invention can send a message to the search **server** or other location to indicate the selected article either before or after the article is...

...amount of time, or after a pre-determined amount of time. For example, the remote **computer** could send a message to the search **server** after the remote user has selected a matched article and had the article open for...

...of time. This I I The invention may be incorporated into a client-side or **server** -side **software** interface which accepts or otherwise records a search query which is forwarded or input directly to another search engine available over the **Internet** . That search engine can then generate a list of matched articles which is then forwarded to the **software** interface wherein the organization method described herein is utilized to rank the articles. Alternatively, the invention can be simply incorporated into the search engine as a single **server** -side or client-side **software** program.

In this connection, the invention may initially or continuously utilize the ranking of ...the article in any manner. For example, the associations may be created by an indexing **software** robot which indexes all words in the article as key terms, meta tags specified by...

...When a search identifies more matched articles than can be displayed on the user's **computer** screen, the altering of the index may affect only those articles which the user has...

...the first 20 articles and selects one of these articles. The matched articles having squibs **displayed** on **screen** are called **displayed** matched articles. The index can be altered so as to alter the key term total...has not selected that matched article from that search.

Further, if the article is not **displayed** on the **screen** because the user does not scroll down to display that article, the key
1 3...
...articles. By score is meant marking, indicia, indicator, data element, or other identifier, whether in **computer** code, a readable language, encryption, or any other method of data, all of which are...neutral vote.

In yet another alternative embodiment, the search activity of a user can be **stored** in the form of what are commonly known in the **computer**

industry as "cookies." For example, the key terms and/or key term groupings and scores for certain articles as a result of the search activity of the user could be **stored** as one or more cookies. These cookies could then be periodically downloaded to a central...

27/3,K/113 (Item 113 from file: 349)
DIALOG(R)File 349:PCT Fulltext

00332990 **Image available**
OBJECT ORIENTED DATABASE MANAGEMENT SYSTEM
SYSTEME DE GESTION DE BASE DE DONNEES ORIENTE OBJET
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BEALL Christopher W,
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MOTYCKA John D,
PENDLETON Samuel S,
SMALLWOOD Thomas D,
TERPENING Brooke E,
TRAUT Kenneth A,
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TERPENING Brooke E,
TRAUT Kenneth A,
Patent and Priority Information (Country, Number, Date):
Patent: WO 9615501 A1 19960523
Application: WO 95US15028 19951113 (PCT/WO US9515028)
Priority Application: US 94339481 19941110; US 95527161 19950912
Designated States: AT AU BB BG BR BY CA CH CN CZ DE DK ES FI GB HU JP KP KR KZ LK LU LV MG MN MW NO NZ PL PT RO RU SD SE SK UA UZ VN AT BE CH DE DK ES FR GB GR IE IT LU MC NL PT SE BF BJ CF CG CI CM GA GN ML MR NE SN TD TG
Publication Language: English
Fulltext Word Count: 77639

= (US) 5742813

Main International Patent Class: **G06F-017/30**
Fulltext Availability:
Detailed Description
Claims

English Abstract
...object oriented database management system. The present invention may be advantageously used in a client/ **server** architecture comprising a knowledge base client and a knowledge base **server** (132). A **plurality** of users may access the system at the same time. In a preferred embodiment, the knowledge base **server** (132) may include a dynamic class manager (134), a connection manager (135), a query manager...

Detailed Description
... database is structured so that
when an item does not have a value, nothing is **stored** .
Therefore, **memory** space is not wasted **storing** null values, and search speed is improved because no time is consumed searching such null...

...products
to market faster. The rewards for an enterprise that is able to achieve this **objective** may be considerable. The penalty for

failing to achieve this **objective** can be the loss of a customer or even an entire market. In a typical...

...the design engineer will be presented with a choice that collectively can have a major **strategic** impact on the firm. The implicit choice that each design engineer faces when specifying and...of materials, group technology, CAD drawing management systems, and occasionally description driven RDBMS applications. These **solutions** are ad-hoc because. 1. These crutches are not complete **solutions** ; they often lead to the circumvention of the existing part selection and release process in...

...the job done.

2. They are based on tools that are designed for other primary **tasks** and are typically inefficient or are misused in this application.

3. The organization develops and...

...additional reason why these past attempts to address this problem cannot be characterized as complete **solutions** . They do not adequately address the company's entire pool of released parts. This parts...how big it is today, it will be bigger tomorrow.

In the past, ad-hoc **solutions** invariably attempted to address the problem by utilizing key-word search tools. Searches on user...The standard relational database management systems (RDBMS) model is unsatisfactory for developing a parts management **solution** . Internally developed corporate systems have inevitably been built on a standard RDBMS technology and, in...

...being a useful and readily available resource of prior company knowledge and investment. Therefore, any **solution** that can affordably transform this pool of existing parts data into a useful information resource...

...embodiment, may include a retriever means, a knowledge base client means, and a knowledge base **server** means. A legacy means is preferably included to facilitate organization of an existing legacy database...

...for use in connection with the present invention. In a preferred embodiment, the knowledge base **server** means includes a dynamic class manager means, a connection manager means, a query manager means...

...database manager means, and a file manager means. A preferred system also includes a registry **server** means and license manager means to control unauthorized user access to the system.

The present...can be both parametric (length, capacitance, etc.) and non-parametric (cost, preferred, etc.). The description **process**

is intuitive to the occasional user and does not require specialized **computer** expertise. Needed parts may be found virtually instantly. This level of performance encourages widespread usage...system environment with connectivity to any other application or system across the enterprise. Enterprise-wide **desktop** access to all parts information is provided. Part information on newly specified parts is instantly...

...parts in the ongoing system.

The present invention may be advantageously used in a client/ **server** architecture comprising a knowledge base client and a knowledge base **server** . The present invention provides a particularly advantageous concurrency control mechanism for an object oriented database management system that is read oriented. In a preferred embodiment, the knowledge base **server** includes an object oriented lock manager, a dynamic class manager, a connection manager, a ...depicting a typical conventional parts management process.

Figure 2 is a diagram of a typical **network** environment that is suitable for use in connection with the present invention.

Figure 3 is...

...flow chart showing a login procedure for accessing the system.

Figure 5 depicts an initial **display** **screen** showing the part specification window.

Figure 6 depicts an example of the part specification window...

...is a flow chart depicting the procedure for opening a class.

Figure 10 depicts a **display** **screen** showing information **displayed** in the ...a flow chart depicting the procedure for selecting text search criteria.

Figure 13 depicts a **display** **screen** showing information **displayed** in the part specification window.

Figure 14 is a flow chart depicting the procedure for...

...numeric search criteria.

Figure 15 depicts a custom numeric dialog box.

Figure 16 depicts a **display** **screen** showing information **displayed** in the part specification window.

Figure 17 is a flow chart depicting the procedure for selecting boolean search criteria.

Figure 18 depicts a **display** **screen** showing information **displayed** in the part specification window.

Figure 19 is a flow chart depicting the procedure for selecting

enumerated search criteria.

Figure 20 depicts a **display screen** showing information **displayed** in the part specification window.

Figure 21 depicts a **display screen** showing information **displayed** in the part specification window.

Figure 22 is a flow chart depicting the procedure for...

...is a flow chart depicting the procedure for displaying search results.

Figure 24 depicts a **display screen** showing information **displayed** in the search results window.

Figure 25 is a flow chart depicting the procedure for...

...is a flow chart depicting the procedure for displaying part information.

Figure 27 depicts a **display screen** showing information **displayed** in the part information window.

Figure 28 is a flow chart depicting the procedure for launching a user action.

Figure 29 depicts a **display screen** showing an example of a user action launched by the procedure depicted in Figure 28...

...depicting the procedure followed when the user actuates the apply button.

Figure 31 depicts a **display screen** showing information **displayed** in the part specification window.

Figure 32 is a flow chart depicting the procedure followed...

...depicting the procedure followed when the user actuates the sort button.

Figure 34 depicts a **display screen** showing information **displayed** in the sort dialog box.
Figure 35 is a flow chart depicting procedures followed when a user edits parts.

Figure 36 depicts a **display screen** showing information **displayed** in the parts **editor** window.

Figure 37 depicts a **display screen** showing information **displayed** in the parts editor window.

Figure 38 is a flow chart depicting procedures followed when...

...a flow chart depicting procedures followed when a user moves parts.

Figure 40 depicts a **display screen** showing information **displayed** in the parts editor window.

Figure 41 shows the internal object representation for a class...a flow chart depicting how the handle manager
responds to a request for the virtual **memory** address of an object
Figure 53 depicts the sequential layout of the dynamic file.
Figure...
...file object.
Figure 62 shows the layout of a Type 1 dynamic object used to **store** a character string.
Figure 63 shows the layout of a Type 2 dynamic object used to **store** data items which are four bytes in length.
Figure 64 shows the layout of a Type 3 dynamic object used to **store** parameter data.
Figure 65 is a flow chart depicting how to add a class to...of the locking function.

Figure 87 depicts match logic in genic.

Figure 88 depicts a **display** **screen** showing information **displayed** in the schema editor window.

Figure 89 depicts a **display** **screen** showing information **displayed** in the schema editor window.

Figure 90 is a flow chart depicting navigation of the class tree.

Figure 91 depicts a **display** **screen** showing information **displayed** in the schema editor window.
Figure 92 is a flow chart depicting reparenting a class to a new subclass.

Figure 93 depicts a **display** **screen** showing information **displayed** in the schema editor window.

Figure 94 depicts a **display** **screen** showing information **displayed** in the schema editor window.

Figure 95 is a flow chart depicting rearranging a class...

...flow chart for the overall legacy procedures
in the class manager.

Figure 97 depicts a **display** **screen** showing information **displayed** in the schema editor window.

Figure 98 depicts adding new classes in the schema editor window.

Figure 99 depicts a **display** **screen** showing information **displayed** in the schema editor window.
Figure 100 depicts a **display** **screen** showing information **displayed** in the schema editor window.

Figure 101 is a flow chart depicting rearranging attributes in the schema editor.

Figure 102 depicts a **display** **screen** showing information **displayed** in the schema editor window.

Figure 103 depicts a **display** **screen** showing information **displayed** in the schema editor window.

Figure 104 is a flow chart depicting the addition of a new enumerated attribute in the schema editor window.

Figure 105 depicts a **display screen** showing information **displayed** in the schema editor window.

Figure 106 is a flow chart depicting the addition of a numeric attribute.

Figure 107 depicts a **display screen** showing information **displayed** in the schema editor window.

Figure 108 depicts a **display screen** showing information **displayed** in the schema editor window.

Figure 109 is a flow chart depicting the addition of a Boolean attribute.

Figure 110 depicts a **display screen** showing information **displayed** in the schema editor window.

Figure 111 is a flow chart depicting the addition of a new string attribute.

Figure 112 depicts a **display screen** showing information **displayed** in the schema editor window.

Figure 113 is a flow chart depicting the addition and insertion of enumerators.

Figure 114 depicts a **display screen** showing information **displayed** in the schema editor window.
Figure 115 depicts a **display screen** showing information **displayed** in the schema editor window.

Figure 116 is a flow chart depicting the deletion of enumerator type attributes.

Figure 117 depicts a **display screen** showing information **displayed** in the schema editor window.

Figure 118 depicts the flow chart for editing a numeric attribute in the schema editor.

Figure 119 depicts a **display screen** showing information **displayed** in the schema editor window.

Figure 120 is a flow chart depicting the addition of...of the flow chart of Figure 166.

Figure 168 is a depiction of a typical **server** architecture for the invention.

Figure 169 is a depiction of a typical client architecture for...
...low chart for invoking the thesaurus editor for an enumerated attribute.

Figure 185 depicts a **display screen** showing the procedure for bringing up a thesaurus editor for an enumerated attribute from the parts specification window.

Figure 186 depicts a **display screen** showing editing an enumerator thesaurus from the parts specification window.

Figure 187 depicts a **display screen** showing editing an enumerator thesaurus from the edit parts window.

Figure 188 is a diagram...

...depicts the management of sorted ranges within a sorted query result.

Figure 190 depicts a **display screen** showing the procedure of bring up a numeric attribute thesaurus editor from the edit parts window.
Figure 191 depicts a **display screen** showing the procedure for editing a numeric attribute thesaurus from the edit parts window.

Figure 192 depicts a **display screen** showing the procedure for editing a unit thesaurus.

Figure 193 depicts a flow chart for editing a unit thesaurus.

Figure 194 depicts a **display screen** showing the procedure for setting up legacy processing for selected parts.

Figure 195 depicts a flow chart for setting up legacy processing for selected parts.

Figure 196 depicts a **display screen** showing the result of legacizing selected parts.

Figure 197 depicts a flow chart for editing the list of attributes to parameterize.

Figure 198 depicts a **display screen** showing the procedure ...of vendor parts.
Figure 202 depicts a flow chart for buffering query result to optimize **network** performance.

Figure 203 depicts editing a non-enumerated thesaurus.

Figure 204 is a diagram of a **network** environment that is suitable for a preferred embodiment of the present invention.

Figure 205 is a **block** diagram depicting an overall architecture I 0 for a system employing a preferred embodiment of...

...when a user selects a "find class" activity.

Figure 216 depicts an example of a **screen display** when navigating the schema by opening and selecting classes.

Figure 217 is a diagram of...add part operation corresponding to Figures 221-222,
Figure 224 depicts an example of a **screen display** when adding a part to the schema.

Figure 225 illustrates a flow chart for an...
...to different locations

in the class hierarchy tree.

Figure 227 depicts an example of a **screen display** when editing a part.

Figure 228 shows a schema corresponding to the schema being edited...

...locks that are
held during the operations described in Figure 241.

Figure 243 illustrates a **screen display** for a preferred embodiment showing a schema developer window that is opened in one step...the lock holder table for the situation depicted in Figure 244.

Figure 246 illustrates a **screen display** for a preferred embodiment showing a search results window that is opened in one step...

...the operation of ending a lock
holder.

Figure 258 shows the major components of a **computer** hardware configuration for a knowledge base **server** .

Figure 259 shows the major components of a **computer** hardware configuration for a retriever, a schema editor, a graphical user interface component, and an...

...after a compare to selected part command has been
invoked.

Figure 264 depicts an initial **display screen** showing the part specification window.

Figure 265 depicts an example of the part specification window during a search.

Figure 266 depicts a **display screen** showing information **displayed** in the part specification window.

Figure 267 is a flow chart depicting procedures followed when a user edits parts.

Figure 268 depicts a **display screen** showing information **displayed** in the parts editor window.

Figure 269 depicts a **display screen** showing information **displayed** in the parts editor window.

Figure 270 is a flow chart depicting procedures followed when...

...a flow chart depicting procedures followed when a
user moves parts.

Figure 272 depicts a **display screen** showing information **displayed** in the parts editor window.

Figure 273 shows the internal object representation for a class...

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

The present invention can advantageously be used in a **network** environment. A number of configurations are possible, and only one example will be described herein...

...not limited to the particular example or configuration described herein. An overview of a suitable **network** environment is depicted in Figure 2.

The **network** 100 includes a first UNIX **server** host 101. one or more knowledge bases 123are installed on the first UNIX **server** host 101. In the illustrated example, a f irst knowledge base **server** daemon 102 runs on the first UNIX **server** host 101. Data may be physically **stored** on a f irst disk drive 103 which is sometimes referred to as secondary **storage** . **More than one** knowledge base **server** 102 may exist on the system 100. For example, a second knowledge base **server** daemon 104 may be provided. Similarly, data may be physically **stored** on a second disk drive 105. The first UNIX **server** host 101 may communicate over a **network** with a second UNIX **server** host 106 and a third UNIX **server** host 107. In this example, a registry **server** daemon . 108 is installed on the second UNIX **server** host 106. The registry **server** daemon 108 could run on the same UNIX **server** host 101 as the knowledge base **server** daemons 102 and 104. Certain files containing information used by the registry **server** 108 may be physically **stored** on a third disk drive 109. The registry **server** 108 is used to administer user access to features and access to knowledge bases. The...manager server 110 controls the number of licenses available to any authorized user on the **network** 100. The license manager 110 uses "floating" licenses.

For example, when 20 licenses are available through the license manager 110, any 20 users of the **network** can use these licenses concurrently.

Before a knowledge base server 102 can be started, the...

...or the knowledge base server daemon 104 using a suitable workstation 111 connected to the **network** 100. For example, a Sun Microsystems SPARCstation 111, preferably running X11R5/Motif v1.2 **software** . Alternatively, a SPARC compatible WO 96/15501 PCTfUS95/15028
2 7
least 4 megabytes of **RAM** **memory** ; 16 megabytes of **memory** is preferred.

The Sun Microsystems SPARCstation 111 similarly has a display 116, a mouse 117, and a keyboard 122.
The illustrated **network** 100 shown in Figure 2 also supports an X Windows client which employs a computer...

...Packard series 700 computer. In a presently preferred embodiment, a single UNIX system on the **network** may be designated to run the knowledge base server daemon 102, the registry server daemon...

...manager server daemon 110. This implementation may provide ease of administration. For best performance, the **software** and knowledge bases embodying the present invention should reside on a single server host 101...

...for example may reside on a remote disk drive 109.

In the present example, the **network** environment includes an operating system with a file system, supports virtual **memory** , employs UDP/TCP/IP protocol, and provides ONC/RPC (open **network** computing/remote procedure call) services. In addition, it is useful if the **network** environment supports multiprocessing and multitasking.
The present system supports interactive editing by the user.

Users...

...provided in the illustrated environment.

A knowledge base 123is a database containing information, and is **stored** on a disk drive 103. The knowledge base 123 in the present example comprises three...pmxdbd servers running.

Unlike an RDBMS based application, with the present knowledge base management system **solution** , complexity, and thus response time, does not increase exponentially with size and number of relationships. Knowledge is not tied to the quantity of **software** code. Schema can be dynamically updated without recompiling the application. Data and schema are interactively...

...the flow continues
to step 153 in which the retriever 130 asks for an appropriate **software** license from the license manager 142.

In step 154, the license manager 142 determines whether...160 shown in Figure 4B. The knowledge base
server 132 attempts to get the appropriate **software** license from the license manager 142. If a license is not granted, flow returns to...

...handle to the retriever 130. The user will
then have successfully logged on to the **network** 100 and will have access to the requested knowledge base server 102.

Figure 168 shows...

...computational and communications
environment for a knowledge base server 132. This configuration consists of a **central processing unit** or **CPU** 2109 which includes an arithmetic logical unit 2100 which fetches and executes program instructions from main **memory** 2101. The programs are **stored** on a disk drive 103, access to which is provided through a disk controller 2106. The knowledge base files 123 are also **stored** on disk drive 103 and accessed through virtual **memory** addresses 2112 in main **memory** 2101, through which, when required, a page 2111 of contiguous data in a disk file 2108 is copied inzc main **memory** 2101. The pref erred embodiment of the present invention uses virtual **memory** 2112 for this knowledge base management system. The knowledge base **server** 132 interacts with the client API 143 through a local area **network** 100, access to which is controlled by **network** controller 2102, or through a wide area **network** 2104, access to which is controlled by a serial interface controller 2103. An I/O bus 2105 mediates data transfers between the **CPU** 2109 and the peripheral data **storage** ,

interface and communication components.

Figure 169 shows the major components of a **computer** hardware configuration 112 providing the computational and communications environment for a retriever 130, schema editor...

...user interface component of legacy 133, and an API 143. This configuration consists of a **central processing unit** or **CPU** 2109 which includes an arithmetic logical unit 2100 which fetches and executes program instructions from main **memory** 2101. The programs are **stored** on one or more disk drives 2110, access to which is provided through ...and mouse or similar graphical pointer 114 with the graphical user interface displayed on the **CRT** display 113. The API 143 communicates with the knowledge base **server** 132 through a local area **network** 100, access to which is controlled by **network** controller 2102, or through a wide area **network** 2104, access to which is controlled by a serial interface controller 2103. An I/O bus 2105 mediates data transfers between the **CPU** 2109 and the peripheral data **storage** , interface and communication components.

Ao Retriever
The retriever 130 is an application that provides a...

...information on the display 116.

Figure 5 depicts a typical display that appears on the **screen** of the **display** 116 after a user successfully logs on to the system. The particular example described herein...

...window 170 appears, as shown in Figure 5.

Initially, the left hand portion of the **screen** 171 **displays** the parts found 172, which in this instance is the total number of parts found...

...example shown in Figure 5,
there are three subclasses.

The right hand portion of the **screen** 175 **displays** root attributes 176. In the illustrated example, the attributes are part number, description, and cost...the abbreviation Ilpf" (for picofarads)
anywhere in the selected part number text attribute 241. To **accomplish** this, a user could type *pf* in the text data entry field 243. In the...thus
proceeding to step 260 shown in Figure 14.

In step 257, a user may **select** a different **unit** of measure other than the default unit of measure 268. The default unit of measure...select an enumerated
attribute 289 by clicking on an enumerated attribute icon 233.

This is **accomplished** in step 305 depicted in Figure 19. The retriever 130 then displays an enumerated attribute...as search criteria, as well as attributes 241, 289, and 236 which were. Selection is **accomplished** by clicking on buttons 298 in the order column 194 to correspond to the desired...optimization of this invention
concerns the management of a query result to optimize use of

network resources, thereby allowing effective access to a knowledge base **server** 132 through a wide area **network** 2103, which typically,has significantly lower transmission speeds and data throughput than a local area **network** 100. This is **accomplished** as shown in the flowchart in Figure ZZZ- In response to a user request to...

...of one additional display page of information without requesting additional information from the knowledge base **server** 132. After scrolling the display, parts information is displayed from the display buffer in step 2132 and control is returned to the user in step 2133. In this way, the **network** transmission cost that would have been incurred if the entire query result were transmitted to the **server** initially is avoided, significantly improving response time to the point where a wide area **network** 2103 provides a practical alternative to a local area **network** 100. This optimization also reduces overall **network** traffic and removes the need for any limits on the number of parts that may...button 343. This user action button 343 is used to launch other
user applications or **software** programs. This provides transparent access to other applications directly from the system. The user.action...

...number 336 is passed to the
Write program 344. Figure 29 shows the user action **display** **screen** 355 when the write program 344 starts, where the part number information 336 was passed...the retriever 130 gets the query results. The
query results are then displayed in a **spreadsheet** format in step 378.

In step 379, the system then handles part move, delete, and...parts appear in a table 1020 that is similar to tables that are used in **spreadsheet** applications. The part attributes 1049, 1050t 1051, etc., and attribute values 1055, 1056, 1057, etc...services may be either local
or result in remote procedure calls to the knowledge base **server** 132. For client applications which run under Windows, the knowledge base client consists of one or more Windows Dynamic Link Libraries (DLL) which use the WinSock DLL to provide **network** access to the knowledge base **server** 132 and the registry **server** 141.

C, Knowledge Base **Server**

The knowledge base **server** 132 is a UNIX **server** process that manages knowledge base 103 access, retrieval and updates. A knowledge base **server** 132 may manage one or more knowledge bases 103 and 105.

11 Dynamic Class Manager

The dynamic class manager 134 is a **software** subsystem in the knowledge base **server** 132 that manages schema and data. The dynamic class manager 134 provides the ability to **store** class, attribute, unit and instance information that can be modified dynamically. The dynamic class manager...the present schema, a class has a parent handle
801. Every class object 800 includes **stored** information representing the handle of its parent class, except in the special case of the root class 173, which has no parent. A null is **stored** in this location in that case. A handle is a reference

to an object. The parent handle information 801 is used by the handle manager 137 to identify the **stored** class object which is the parent class for the class 800.

The class object 800...

...representation
provided in the present invention, lists can grow without bounds and are dynamic. The **storage** space available is not fixed.

This provides flexibility and power to the database structure, because...list 803 is a list of handles. The handle manager 137
may use the information **stored** in the attribute list 103 to identify the attributes possessed by class object 800.

The...

...which is a handle list. Field 805 shown in Figure 41 is a pointer to **storage** location of the class name, i.e., the text identifying the class.

Field 806 is used to **store** the handle for the class 800.

The field 807 **stores** an indication of the class code, i.e., whether it is primary, secondary, or a...the data structure of the attribute
object 827 shown in Figure 43, this information is **stored** in field 832. The attribute object 827 also contains a field 833 which is a...

...134 will check the class object 800 and retrieve the attribute list 803. The handles **stored** in the attribute list 803 will be passed to the handle manager 137. The handle manager 137 will return the virtual **memory** address for each attribute 827 of the class. The dynamic class manager 134 may then...to the external name for the unit. The
handle for the unit object 850 is **stored** in the second field 852.

The third field 853 contains the handle for the defining...comprises fields 851 - 855.
In addition, it will include a field 863 in which is **stored** the handle for the base unit. A second additional field 864 will contain a multiplication...

...to the handle manager 137, and the handle manager 137 provides the address in virtual **memory** for the unit family 845. It should be understood therefore that the handle manager 137...

...866
is 11kohms". The real derived unit 866 has the handle of the base unit **stored** in field 863. The handle **stored** in field 863 is used to lookup the base unit 850, whose name 852 in...accordance with the present invention is that if a primary value is undefined, nothing is **stored** . Thus there is no wasted space.

Another advantage of the database structure is that algorithms...

...to facilitate fast deletions.

In a pref erred embodiment, the value of parameters are always **stored** in base units. The objects in fields described do not necessarily occupy a word of **memory** . In a preferred embodiment, all parameters of a particular type are **stored** contiguously. This improves the speed of searches. For example, the case type 8411 described with reference to Figure 51 would be **stored** contiguously with all the other parameters for case type. The numeric parameter of 5,0 volts would be **stored** in a different physical location in **memory** contiguous with other numeric volt parameters.
As described above, providing a class object structure 800...

...attributes desired and narrowing the search down to a small number that do.

This is **accomplished** by navigating to the correct class from the root of the classification hierarchy. During this...

...is
created in step 1847 first, and then the new class is created in internal **memory** in step 1848. The new handle is inserted into the table of class handles in...the file manager 140to add the new class to the indicated parent on the secondary **storage** device 103.

To add an attribute to a class, three items must be known.

the...

...step is 1940 of
Figure 68 to cause the file manager 140 to update secondary **storage** 103 with the new attribute. The operation is complete in step 1941.

The addition of...

...the presence of the new instance
in 1924. The instance has now been created in **memory** , and needs to be added to secondary **storage** 103, which is done in step 1925 of Figure 70. The procedure is complete in...step 2612, the file manager 140 is instructed to remove the class object from secondary **storage** 103, and the operation completes in step 2613.

The deletion of an attribute is shown...

...Figure 74. The file manager 140 is then instructed to remove the attribute from secondary **storage** 103 in step 1870. The operation is complete in step 1871.

The deletion of an...the subtree in 2005. The file manager 140 is then instructed to update the secondary **storage** 103 to reflect the deletion of the instance in 2006. The operation is complete in...1830.
2, Connection Manager
The connection manager 135 is a subsystem of the knowledge base **server** 132 that manages information about the current client connections. The connection manager 135 is responsible for creating, maintaining, and closing client 130, 133, or 144 connections to the knowledge base **server** 132. The connection

manager 135 will create an instance of query manager 136 for each...

...136.

3, Query Manager
The query manager 136 is a subsystem of the knowledge base **server** 132 that interacts with the dynamic class manager 134 to provide query operations on the...maintain a copy of the dynamic class manager schema and instance
data on secondary persistent **storage** 103. Changes, as they are made to the schema and instances are also made in secondary **storage** . The dynamic class manager 134 is initialized by reading the data, via the file manager 140, from secondary **storage** 103. Other secondary **storage** mechanisms could be implemented which follow the interface specification. Other implementations could use commercial data...query result.
Incremental sorting requires tracking which instance handles in a query result have been **sorted** and which have not. To **accomplish** this, the query result is sub-divided in to ranges.

There are two types of...of the dynamic class manager 134 that provides services for creation, deletion, and disk-to- **memory** mapping of handles for all objects. The handle manager 137 comprises two lists of virtual **memory** addresses which are shown in Figure 42. The first list 810 contains the virtual **memory** addresses 810-814 of schema objects (classes, attributes, enumerators, units, and unit families) . The second list 811 contains the virtual **memory** addresses 815-826 of instances. A handle is an index into a list. Thus, given...

...handle, the handle manager 137 can return to the dynamic class manager 134 the virtual **memory** address of the desired object.

When the dynamic class manager 134 needs to examine the...

...it has a handle, the handle manager 137 responds to a request for the virtual **memory** address of the object as shown in Figure 52. The procedure begins at step 1000...

...not valid, an error condition is generated and the handle manager returns a NULL virtual **memory** address to the dynamic class manager 134 to indicate the error in step 1002. Otherwise...

...handle manager 137 continues with step 1003.

If the handle is valid, then the address **stored** in the appropriate list (schema object or instance) is examined at step 1003. One special virtual **memory** address is reserved to indicate that an object with the given handle is deleted. only objects which are deleted are allowed to have this special **memory** address. If the address found from the handle look up in step 1003 is the...

...then an error condition is generated and the handle manager 137 returns a NULL virtual **memory** address in step 1004 to the dynamic class manager 134.

otherwise, the handle manager 137 continues with step 1005.
If the virtual **memory** address found in the list at step 1005 is

not a NULL pointer, then processing continues at step 1009. if the virtual **memory** address found at step 1005 is NULL, then the requested object is not present in **memory** . The handle manager 137 makes a request to the file manager 140 to read the object with the given handle from secondary **storage** 103, create the object in the virtual address space, and return the virtual **memory** address to the handle manager 137 in step 1006.

At step 1007, the virtual **memory** address of the object which has been created by the file manager 140 is tested against the special deleted virtual **memory** address. If file manager 140 has determined that the object is deleted, then an error...

...at step 1009.

At step 1009, the handle manager 137 has identified a valid virtual **memory** address for the object with the given handle. The type of the object is tested...an object is deleted on behalf of a function
of the API 143. The virtual **memory** address **stored** in the list which is indexed by the given handle is set to the special...
...searching and sorting the numeric values in the database 123 has significant advantages compared to **storing** the numeric values devoid of units.

6, File Manager
The file manager 140 is a subsystem of the knowledge base **server** 132 that provides access to a secondary **storage** mechanism 103 for the schema objects and instances. The file manager 140 provides an access...

...the dynamic class manager
134 and handle manager 137 an abstract interface to the persistent **storage** 103 of knowledge base objects. In other usage.

Functions for opening and closing secondary **storage** are used by the class manager 134 when the class manager 134 is created to service a knowledge base 123when a knowledge base **server** 132 is started or when the knowledge base **server** 132 terminates. The class manager 134 uses a warm start function to initialize the knowledge base **server** 132 in the desired configuration. A factory creation function is used by a file manager...base 123. The file manager 140 is responsible for insuring that the data in secondary **storage** 103 models exactly the data in the dynamic class manager 134.

Additional file manager functions...

...dynamic class manager 134 uses the handle
of some object which is not in virtual **memory** (see Figure 52, step 1006). These functions construct the object in virtual **memory** by reading the object from secondary **storage** 103. The address of the created object is returned to the handle manager 137.

Table...

...cd boolean deleteDerivedUnit
virtual cd-boolean setAttributeUnits
Table 6

Functions for opening and closing secondary **storage** .

cd.fileManager
virtual -cd-fileManager
A function for warm starting.

virtual cd-class CD.FAR...

...manager.

static cd-fileManager * make
Functions used by the handle manager for faulting
objects into **memory** .

virtual void getClass
virtual void getAttribute
virtual void getEnumerator
virtual void getUnit
virtual void getUnitFamily...

...of any of these functions
is null. The null file manager 140 provides no secondary **storage**
for the dynamic class manager 134. The purpose for this type of
file manager 140...

...is the Cadis
File Manager (called "cdsdbmgr.hxxN). The Cadis File Manager
interacts with secondary **storage** for persistent **storage** of the
schema objects and instance objects. The formats of the files
as **stored** on secondary **storage** are shown in Figures 53 - 64. The
Cadis File Manager also manages the details of simple files on secondary
storage
103. Although the secondary **storage** copy can be thought of as
a single knowledge base 123, for convenience it is mapped to
three files on secondary **storage** . These three files are known
as the schema file, the instance file and the dynamic...

...of the file header 2401 which is
present in all three files. The first six **computer** **storage** words
in the headers of the three files follow the same format across
files. These...the instance file
will all be instance objects. Each instance object is comprised
of four **computer** **storage** words. Figure 61 shows the layout of
an instance file object 2511. The instance object...

...length objects which have various types based on the
size of the components which are **stored** therein. Figure 62 shows
the layout of a type 1 dynamic object 2512 which is used to **store**
a character string. A type 1 dynamic object contains a flag to
indicated if it...

...2516, a type code which is I'll,
2517, the length of the character string **stored** 2518, the amount
of space actually allocated in the file for the character string
2519, a two-byte filler 2520, and a block of characters which
contain the **stored** string 2513. Figure 63 shows the layout of
a type 2 dynamic object 2514 which is used to **store** data items
which are four bytes in length, such as handles, integers, reals,
offsets, etc...

...type code which is 1121,
2522, a two-byte filler 2523, the length of the **stored** data 2524, the amount of space actually allocated in the file for the data 2525, and a block of data which contains the actual **stored** values 2515. Figure 64 shows the layout of a type 3 dynamic object 2526 which is used to **store** parameter data. Each **stored** parameter takes 4 **computer** words. A type 3 dynamic object contains a flag to indicated if the object has been deleted 2527, a type code which is 11311 2528, the length of the **stored** data 2529, the amount of space actually allocated for the data 2530, a two-byte...
...parameter is of Boolean type, the parameter object will also contain the actual Boolean value **stored** 2539 and a filler.

7, DataBase Manager
The database manager 139 is a subsystem of the knowledge base **server** 132 that **stores** and manages high-level information about knowledge bases 123 being managed by the knowledge base **server** 132. A graphical representation of the data maintained by the database manager 139 is shown...

...maintains a linked list of entries about knowledge bases 123 managed by the knowledge base **server** 132.

The database manager 139 is responsible for concurrency control on database objects. For concurrency...the database manager level, and this relieves the
class manager 134 from subsequent lock conflict **resolution** .

Do API
The application programming interface or API 143 refers to the external C or C++ language functions that provide access to the functions provided by the knowledge base **server** 132, registry **server** 141, and license manager 142 functions to client applications 130, 133, and 144.

Eo Registry **Server**
The registry **server** 141 is a UNIX process that provides administration and security functions for users and knowledge...

...mapping user access rights to knowledge bases 123.
Knowledge base administration provided by the registry **server** includes RPC service mapping, host **CPU** mapping, and logical to physical name mapping.

F, License Manager
The license manager 142 is a UNIX **server** process (which in the illustrated example is called Ilpmxlm") that provides **software** license control for the **software** and for licensed knowledge bases 123. Satisfactory operation of the license manager 142 may be achieved using a conventional Elan License Manager available from Elan **Computer** Group, Inc.

Go Schema Editor
The schema editor 144 is an application that provides a...
...information on the display
116.

Figure 87 depicts a typical display that appears on the **screen** of the **display** 116 after a user successfully logs on to the system and selects schema editor from...

...window 500 appears, as shown in Figure 89. Initially, the left hand portion of the **screen** 501 **displays** the class title edit box 502, which is used to change the title of the...shown in Figure 89, there are three subclasses 508.

The right hand portion of the **screen** 509 **displays** the root attributes 516. In the illustrated example, the attributes are "Part number", "description", and...The user can then select either OK or cancel in step 585. If OK is **selected** , the **unit** family dialog 1600 is displayed in step 595.

The unit family dialog 1600 contains a...merged with other descriptions of these parts. The resulting optionally augmented part legacy data is **stored** in files 607. Step 608 includes running the classify program to perform initial classification of...customer. In step 613, this knowledge base is delivered to the customer by means of **computer** tape, disks, or other **computer** -readable means, with the delivered knowledge base 614 being further maintained and enhanced by the...

...part function 1101, parameterize a part function 1102 of the legacy manager 145, along with **software** programs for performing initial part classification 3001, a schema generation program 3002 for custom schema...

...also provides a graphical user interface for the creation, modification and deletion of thesaurus entries **stored** as metadata associated with classes, numeric attributes, boolean attributes, enumerators of enumerated attributes, and units...selecting Open from the drop down menu choice File 1201 in Figure 171.

The registry **server** 141 is queried for a list of knowledge bases and rights available to the user...

...schema 1205, and make parts 1206 shown for each knowledge base known to the registry **server** 141. When a user selects a knowledge base, such as the example "fifill 1202 shown...other legacy and schema editor users and allowing class access conflicts to be more easily **resolved** .

Legacy 133 also provides a user interface for class thesaurus editing as shown in Figure 179. The copy button is used to **store** the contents of the currently selected thesaurus entry 1229 in step 637 so that it... enumerated attributes, boolean attributes, numeric attributes, and units. Classification by the legacy manager 145 is **accomplished** by the classify a part function 1101, a non-parsing method employing matching of thesaurus...

...a score equal to the current winner within a sibling group, the winning score is **stored** and the current winner is marked as tainted and may not be declared the winner...to Figure 137, where the subtree will be explored for a better match. This is **accomplished** by recursive descent of the subtree, which begins with getting the list of subclasses for...processed. If the returned winner has a higher

score than the current winner, it is **stored** as the current winner in step 1116 and further competition within this subtree is with...Rgstr R*g*st*r
Register Register The comparison covers 100 O@o
Microproc Microproc
Microprocessor Microprossor The comparison covers 75
The * characters here represent a character inserted into the string...

...be the same, and can be
detected by a human as the same word, but **computers** can not.

Typographical errors occur when a human entering data on a standard "qwerty" keyboard process in step 968 of Figure 151 yields a single match, then the **decision** will be made in step 969 to combine the current part description with an existing...Part Number = 2901A
Assume that the base number 2901 was only found under one classification, **microprocessors** , in the published database.

candidate #1 would ...import map and import file that maps to a knowledge base.

The operation of this **software** is described in the f low diagram Figures 165 - 167. Operation begins when the commercial...extra column of data to the customer data section in an import file. This is **accomplished** by specifying the two attribute names separated by a I,!" symbol (e.g., Description!Description2...or schema.

Although the invention has been described herein with reference to a local area **network** , those skilled in the art, after having the benefit of this disclosure, will appreciate that...

...are possible. For example,
the system could be implemented on a main frame or single **computer** having **multiple** user stations. The system could also be implemented over a **network** other than a **LAN** , such as a wide area **network** or the **InterNet** .

Additional file manager 140 derivations are possible. The interface provided by the file manager 140...
...maintain a copy of the dynamic class manager schema and instance data on secondary persistent **storage** 103. Changes, as they are made to the schema and instances are also made in secondary **storage** . The dynamic class manager 134 is initialized by reading the data, via the file manager 140, from secondary **storage** 103.

Other secondary **storage** mechanisms could be implemented which follow the interface specification. other implementations could use commercial data...

...presently preferred embodiment of the present invention is shown in Figure 204, and employs a **network** 4100 having a client/ **server** architecture comprising one or more knowledge base clients 4112, 4118 and 4111, and a knowledge base **server** 4108.

In the preferred embodiment shown in Figure 205, the knowledge base **server** 4108 includes an object oriented lock manager 4125, a dynamic class manager 4134, a connection...

...4137, a units manager 4138, a
database manager 4139, and a file manager 4140. A **server** host 4109 may be designated to run the knowledge base **server** 4108, with the **software** and knowledge base 4123 preferably residing on a local disk drive 4110. A knowledge base client 4131 interacts with the knowledge **server** 4132 over a **network** 4100 in the illustrated embodiment. A preferred system includes a registry **server** 4141 and a license manager 4142 to control unauthorized access to the system. ...4137, the units manager 4138, the database manager 4139, the file manager 4140, the registry **server** 4141, the license manager 4142, the API 4143, the legacy manager 4145, and the knowledge...

...a plurality of
users or clients 4111, 4112, and 4118 are shown connected to the **network** 4100. A first client 4111 runs on a Sun Microsystems SPARCstation 4111, which is shown...

...mouse
4117, and a keyboard 4122. A second client 4112 runs on an IBM compatible **computer** 4112, shown having a display 4113, a mouse 4114, and a keyboard 4115. A third X Windows client 4118 is illustrated having a **computer** 4118, a display 4119, a mouse 4120, and a keyboard 4122.
The present system supports...ect a
group of class share locks. Therefore, in a preferred embodiment, the knowledge base **server** 4132 actually supports four lock types: exclusive, update, and two flavors of share locks.

The...deleting instances, modifying parameter values, or editing the schema. As noted above, the knowledge base **server** 4132 supports two types of write locks: exclusive locks and update locks.

Exclusive locks are...attributes which are defined by that class.

The lock manager 4125 and the knowledge base **server** 4132 require an application to become a lock holder before it can request a lock...

...thus starting a lock holder.

The pmx,
startLockHoldero function is described more fully in the **software** functions section. The combination of the application's connection to the knowledge base **server** 132 and the lock holder are what distinguish one application from another for **resolving** conflicts between locks. An application can start multiple lock holders and thus cause conflicts for...

...a lock holder by ending the lock holder.

Each application connection to the knowledge base **server** has a unique lock holder table 4146 as shown in Figure 205. The lock holder...in
the hie rarchy 4215. The determination of conflicts is performed in accordance with the **matrix** represented in Figure 208. If the requested lock for class 4200 is a class share...

...points in the hierarchy 4215.

The determination of conflicts is performed in accordance with the **matrix** represented in Figure 208. The class 4200 is represented in Figure 210 as a shaded...points in the hierarchy 4215. The determination of conflicts is performed in accordance with the **matrix** represented in Figure 208. The class 4200 is represented in Figure 211 as a shaded...

...schema. The lock table 4400 is maintained in the illustrated example by the knowledge base **server** 4132.

The lock table 4400 shown in Figure 254 is organized in the preferred embodiment...to class 4243 in the schema 4248 shown in Figure 221. Figure 224 shows the **screen display** during the process of adding a part under these circumstances. In order to perform the...4241 should be visually indicated by highlighting 4292, or some other distinguishing feature. The user **accomplishes** the move function by clicking on the move command button 4335.

Figure 236 depicts a...lock on the subtree that the user wishes to modify.

The procedure for attempting to **accomplished** this begins with step 4341, where a tree exclusive lock is requested for the active...

...the TXL lock is granted, the method proceeds to step 4343 and the schema developer **screen** 4350 is **displayed** . Following step 4343, the CSL locks that were obtained for the retriever 4290 on the...of the lock object 4260 are also shown in Figure 242.

Figure 243 illustrates a **screen display** for a preferred embodiment showing a schema developer window 4350 that is opened in step...

...desired information, there will need to be locks present. In order to obtain locks, the **software** 4131 must become a lock holder. A request for a new lock holder is performed...

...the lock holder request is granted, then the flow proceeds to step 4363 and the **software** 4131 requests a TSL (tree share lock) on behalf of the user. If the TSL...schema.

The present invention may include a knowledge base client means and a knowledge base **server** means. The knowledge base **server** means preferably comprises an object oriented lock manager means. The knowledge base **server** means preferably includes a dynamic class manager means, a connection manager means, a query manager...
...manager means, and a file manager means.

Figure 258 shows the major components of a **computer** hardware configuration 4109 providing the computational and communications environment for a knowledge base **server** 4132. This configuration consists of a **central processing unit** or **CPU** 6109 which includes an arithmetic logical unit 6100 which fetches and executes

program instructions from main **memory** 6101. The programs are **stored** on a disk drive 4110, access to which is provided through a disk controller 6106. The knowledge base files 4123 are also **stored** on disk drive 4110 and accessed through virtual **memory** addresses 6112 in main **memory** 6101, through which, when required, a page 6111 of contiguous data in a disk file 6108 is copied into main **memory** 6101. The preferred embodiment of the present invention uses virtual **memory** 6112 for this knowledge base management system. The knowledge base **server** 4132 interacts with the client API 4143 through a local area **network** 4100, access to which is controlled by **network** controller 6102, or through a wide area **network** 6104, access to which is controlled by a serial interface controller 6103. An I/O bus 6105 mediates data transfers between the **CPU** 6109 and the peripheral data **storage** , interface and communication components.
Figure 259 shows the major components of a **computer** hardware configuration 4112 providing the computational and communications environment for a retriever 4130, schema editor...

...user interface component of legacy 4133, and an API 4143. This configuration consists of a **central processing unit** or **CPU** 6109 which includes an arithmetic logical unit 6100 which fetches and executes program instructions from main **memory** 2601. The programs are **stored** on one or more disk drives 6110, access to which is provided through a disk...

...and mouse or similar
graphical pointer 4114 with the graphical user interface displayed on the **CRT** display 4113. The API 4143 communicates with the knowledge base **server** 4132 through a local area **network** 4100, access to which is controlled by **network** controller 6102, or through a wide area **network** 6104, access to which is controlled by a serial interface controller 6103. An I/O bus 6105 mediates data transfers between the **CPU** 6109 and the peripheral data **storage** , interface and communication components.

The present invention may be advantageously used in a client/ **server** architecture comprising a knowledge base client and a knowledge base **server** , as shown in Figure 204. However, the invention is not necessarily limited to a client/ **server** architecture. The invention may also be used in a distributed database system.

C, object Oriented...parts appear in a table 5020 that is similar to tables that are
used in **spreadsheet** applications. The part attributes 5049, 5100, 5101, etc., and attribute values 5105, 5106, 5107, etc...services may be either
local or result in remote procedure calls to the knowledge base **server** 4132. For client applications which run under Windows, the knowledge base client consists of one or more Windows Dynamic Link Libraries (DLL) which use the WinSock DLL to provide **network** access to the knowledge base **server** 4132 and the registry **server** 4141.

The knowledge base **server** 4132 is a UNIX **server** process that manages knowledge base 4110 access, retrieval and updates. A knowledge base **server** 4132 may manage one or more knowledge bases 4110 and 4110.

The dynamic class manager 4134 is a **software** subsystem in the knowledge base **server** 4132 that manages schema and data. The dynamic class manager 4134 provides the ability to **store** class, attribute, unit and instance information that can be modified dynamically. The dynamic class manager...

Claim
... instances are represented as an owning class and a list of information with no additional **storage** allocated for undefined characteristics.
6 The database management system according to claim 3 further comprising...instances that correspond to a subset of said predetermined set of search criteria.

14 A **network** having a client/ **server** architecture, comprising:
a knowledge base **server** , the knowledge base **server** including a dynamic class manager, a connection manager, a query manager, a handle manager, a...

...interface to permit a client application to access the object oriented hierarchical schema.

15 The **network** according to claim 14, wherein:
at least one class in said object oriented hierarchical schema...and that are present in all descendants of said class object.
1 9

16 The **network** according to claim 15, wherein:
at least one class in said object oriented representation of...

...class object and that are present in all descendants of said class object.

17 The **network** according to claim 16, further comprising:
an object oriented lock manager, said object oriented lock...

...of said object oriented hierarchical schema.

18 A parts management system, comprising:
a processor;
a **display** having a **screen** , the **display** being coupled to the processor;
a mouse coupled to the processor;
a knowledge base accessible...of parts information; and,
means for displaying attributes in an attribute display area of the **screen** , the attribute **display** area being distinct from the tree display area, the means for displaying attributes being coordinated...

...in the tree display area.

22 An object oriented database management system in a client/ **server** architecture, comprising:
a knowledge base client;
a knowledge base **server** , the knowledge base **server**

including a dynamic class manager, a connection manager, a query manager, a handle manager, a...

27/3,K/119 (Item 119 from file: 349)
DIALOG(R)File 349:PCT Fulltext

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DOCUMENT MANIPULATION IN A DATA PROCESSING SYSTEM
MANIPULATION DE DOCUMENTS DANS UN SYSTEME DE TRAITEMENT DE DONNEES
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Detailed Description
Claims

English Abstract
A **data processing** system provides a desk view which serves as a graphical user interface to the system...

Detailed Description
DOCUMENT MANIPULATION IN A **DATA PROCESSING** SYSTEM
Related Applications
This application is a continuation-in-part of U,S.

Patent Application- -Serial No, 200,,091,, filed on May 27,, 1988,
Background of the Invention
In **many** of today's businesses, various **tasks** are now automated by **computers** , For instance,, a word processor enables the reorganizing and rewriting of documents without the retyping known in the past, In addition, various documents may be organized and **stored** by a **computer** filing system which allows retrieval by name, by chronological or alphabetical order, or by other user-desired identification. Another example is a mail system on a **network** of **computer terminals** which allows messages to be sent to and from users of the **network** .

Also, a phone system may be connected to a mail system which in turn enables phone messages to be **stored** and later forwarded to users. These and other **computer** devices enable various daily office **tasks** to be **accomplished** more quickly and more efficiently.

However, most **computer** devices require the user to be

computer literate and to learn commands to direct the **computer** to perform the desired **tasks** , In more recent **computer** developments, user interaction with the **computer** , or as generally referenced in the art, the user interface, comprises menus or a series of commands from which to choose. For each **decision** juncture during the use of a **computer** device, an appropriate menu is displayed to the user to prompt the user on the...

...choose the command from the menu which will direct (in part or in full) the **computer** to perform the desired **task** . Due t o the menu providing the proper possible commands, the user does not have to remember or recall commands to the **computer** , Hence, the menus are considered to make **computer** devices more "user friendly". Although,, the choices on a menu generally are descriptive phrases written...

...which are more common to our everyday language rather than in a coded or technical **computer** language,, the descriptive phrases may not initially have meaning, or at least the proper meaning, to a first-time user or a user who is not **computer** literate. The user does have to learn the respective meaning of each menu choice.

In addition, the input devices through which the user communicates commands or menu selections to the- **computer** pose various complexities. For example, a keyboard requires knowledge of the position of each key...

...remembered by the user, In turn, many off ice personnel do not make use of **computer** devices because of the time and complexity in learning to operate these devices, Accordingly, there is a need to make **computer** devices, and particularly those for office use, more "user friendly" and readily useable especially to first-time and **computer** illiterate users, Summary of the Invention The present invention discloses a **computer** device which provides. a graphically based user interface which simulates an office desk and a user's interaction with the items on the desk. In general, the disclosed **computer** device is employed by a **terminal** or a **network** of **terminals** of a digital processing system, Each **terminal** typically provides a monitor **screen** which **displays** various views to the user, a keyboard which enables typed input to the digital processing...

...further user interaction with the digital processing system but in a natural format. For each **terminal** , an audio input/output assembly may also be connected to the **terminal** to provide audio input to the digital processing system. Also, each **terminal** may be connected to a printer, a scanner and/or a facsimile transmitter and receiver.

The natural format by which the user communicates

with the **computer** through the electronic stylus is one aspect. of the user interface of the present invention...results,, interaction with the processing system through the stylus and tablet is easily and naturally **accomplished** .

A second part of the user interface disclosed by the present invention is a screen view of a **computer** work area called the user's system desk, distinguished from the user's office desk,, and displayed on the **terminal** monitor screen to provide a representation of all the documents and accessories which are currently...

...the user during use of the stylus in the foregoing described manner, Of course, the **terminal** keyboard and monitor may be used to run various programs and provide numerous other functions...

...Serial No. 200,,091 by Levine et al. for "Document Annotation and Manipulation in a **Data - Processing** System" assigned to the assignee of the present invention and herein incorporated by reference, The...

...the every-day interaction between a person and his office desk, As a result, the **computer** device of the present invention is a degree "friendlier" than the menu driven and other...

...or "stamp" of one page of each document on the user's system desk or **computer** work area. Each stamp serves as a unique, direct representation, that is an actual image...trays are of two types, active and passive. Active trays may be accessed throughout the **network** of **terminals** which communicate with the local **terminal** of the user. Each active tray is labelled with a name which is recognizable throughout the **network** , The user, who is the owner of the active tray, authorizes other users access to the active tray. In such a case, an authorized user on another **terminal** of the **network** may access the contents of the active tray as well as add to the contents...
...the tray. A passive tray may be used only by the user of the local **terminal** .

In one embodiment a folder enables user viewing of stamps contained therein - while order of...

...differs from active trays in that active trays are accessible by other users of the **network** only as authorized by the local user, In addition to selecting which users have access...represented by a duplicate stamp. The "mail" application invokes the electronic mail system of the **network** and enables the user to transfer the document of a selected stamp from the user...of stamps, the documents of the stamps become stapled or unstapled accordingly, other accessories for **network** communications or

communications to a remote facsimile, for example, may also-be provided on the...

...upon illustrating
the principles of the invention.
Figure 1 is a schematic view of a **data processing** system which embodies the present invention.

Figures 2a-2f are illustrations of a desk view...

...desk view of Figure 2a-2f.

Figure 7 is a flow chart of a supervisor **task** for implementing operation of the desk application of the system of Figure 1,
Figure 8 is a flow chart of a tablet **task** for implementing the desk view of Figures 2a-2f.

Detailed Description of a Preferred Embodiment
Generally speaking, the present invention discloses a graphically based user interface in a **computer** device which simulates a desk,, referred to as the user's system desk, and user...

...invention are described in more detail and are more readily understood with reference to a **data processing** system which embodies the present invention and which is illustrated in Figure 1, The **data processing** system 20 includes a **computer terminal** 10 with a keyboard 12 and a display unit 18,, a two-ended electronic stylus...

...and
driven by a digital processor 22, Digital processor 22 may be of the multi- **task** type but a single **task** type is assumed in the description of the preferred embodiment, Preferably an audio assembly having...

...input and output
port, such as a telephone set 24, is also connected to the **terminal** 10 for combining audio information with visual information input through the stylus 14 and keyboard 12, In addition, a facsimile and/or **network** transmitter and receiver 51 is coupled to **terminal** 10 for providing further communication means.

As used herein, "facsimile" refers to the method of...

...by electronic means
under the standards set forth by the International Telegraph and Telephone Consultative **Committee** ,
It is understood t hat display unit 18 provides a video display but is not limited to a raster type **CRT** and may be of an LCD or gas plasma type display unit or of other...

...is used on an upper planar surf ace of
the tablet 16 to perform certain **tasks** such as repositioning displayed items, or selecting
a displayed item for further processing. The actions...

...may be a single unit such that the stylus 14 is operated directly on the **screen** of the **display** unit 18.

The electronic stylus 14 and tablet 16 may be generally of the type...

...4,,577,057 all to Blesser et al. In such systems, the tablet includes a **grid** of conductive elements and the stylus contains an electric coil, The coil in the stylus is inductively coupled to the **grid** in the tablet by energizing either the coil or the **grid** with an AC voltage signal. The voltage signal induced in the other component is then. measured and used to determine the position of the stylus relative to the **grid** . The unique features of the electronic stylus 14 and tablet 16 of the present invention...As illustrated in Figures 2a-2e, the desk view 32 is central to the various **tasks** and applications of the system 20 and serves as the visual portion of the interface...

...embodiment, the desk view 32 provides a user's system desk 36 which represents the **computer** work area of the user and appears as the background of the desk view 32...

...particular, various direct treatment and direct manipulation of stamps 34 in desk view 32 are **accomplished** by applying the different stylus operations to the stamps, For instance, the full-screen image...

...the corresponding stamp 34. Selection of a stamp 34 during the desk view 32 is **accomplished** by the touching and lifting of one end of stylus 14 on the tablet position...71 behaves somewhat like a single stamp. Specifically, movement of the whole stack 71 is **accomplished** by the touch and move operation of the stylus 14 on side regions 73 of...

...interfaced to the preestablished electronic mail system, and thus accessible for mail purposes throughout a **network** of **terminals** to which system 20 belongs, Common addressing techniques are used.

The user-owner of the...

...36 as shown in Figure: 2c. An active tray 40 may be accessed throughout the **network** of **terminals** which communicate with the local **terminal** 10 of the user-owner, Hence,, active trays 40 may hold items provided to the...

...is labelled with a user specified name which is recognizable to other users throughout the **network** . Processor 22 accordingly provides a globally accessible address which corresponds to the named tray.

For...trays, a passive tray 42

may be accessed only by the user of the local **terminal** 10, A user establishes a passive tray 42 by providing a local name, that is one which is not known throughout any **network** of **terminals** .

As shown in Figure 2c, all icons of the trays (In-Box 63, active trays...32 are designated by icons labelled with names of other users in communication with the **terminal** 10 of the user, These named depository icons 50 serve as outgoing mail drops for...

...on the user's system desk 36, the pre-existing electronic mail system of a **network** of **terminals** is used. An icon representing a mailbox 52 provides the user with the services of...an address book 83 shown in Figure 2e, The address book 83 serves as a **workstation** directory of all users of the system 20 of Figure I or of a **network** of such systems, When the send-mail routine is activated, processor 22 exhibits an illustration...

...user opens the address book 83 to the name of the desired recipient.

This is **accomplished** by the user touching and lifting- an end of stylus 14 an the tablet position...

...system desks of the chosen recipients.

The address of a chosen recipient may be a **network** **memory** address, a facsimile number, a PC Local Area **Network** number.. a PBX identif ication number, and/or a standard data modem address. In the...image- only handling requirement of facsimile machines, In the same manner , system 20 at each **workstation** 10 employs the router routine for receiving and unpacking mail sent to the local user...

...The router routine then provides necessary handshaking and timing pro tocol between the systems 20 **network** **server** or device driver servicing the sending party over a PC **LAN** or **network** line. When the sending party is communicating over a facsimile line no such handshaking is...

...necessary f iles associated with the subject document, and subsequently places the files in local **memory** . The stamp representing the received mail is displayed in the In Box 63 in the...

...system 20, a facsimile modem card is coupled to the processor (e.g., a personal **computer**) which the supports **workstation** **terminal** 10 (Figure 1) or a stand alone facsimile machine 51 is interfaced with the WO...

...is understood that various and numerous commands may be similarly communicated to the user's **workstation** 10 from the remote facsimile. Examples of the variety of commands and thus extensive control...

...the current image of the desk view 32

provided to the remote user from the **workstation** 10, may be return transmitted (i,e, from ...the request for printing.

Repositioning of the printer icon 72 in desk view 32 is **accomplished** by operating the stylus in the touch and move manner on any part of icon...

...the user leaving the stamp 34 on T@ the trash barrel icon 74,, the processor **stores** the stamp accordingly. A subsequent positioning of the stylus end over the lid 84 of...data structure employed to implement the trash barrel 74 which is, in general, a disk **storage** area,
According to the foregoing, processor 22 must distinguish, treatment through the lid 84 f...

...processor operation for scanning an image preferably operates a scanner coupled to processor 22 in **workstation** 10. The image being scanned may be displayed on display unit 18 during the scanning...of paper documents in everyday usage and the user interface of desk view 32 provides **computer** automation of everyday usage without complicated commands or complex user-to- **computer** protocol,
The foregoing has described specific accessories or processor operations provided in the desk view...background color and the color comprised of the average red,, green and blue amounts of **block** 93, is **selected** ,to define the color of the stamp pixel corresponding to **block** 93.

The **selected** point is mapped to a byte value according to the regularized -partitioning of color space...the degree of detail maintained from the image reduction schemes of the present invention.

To **accomplish** the foregoing image **reduction** schemes for multi-colored or black and white images, the necessary original image pixel information may be obtained from a full page representation **stored** in **memory** . The determination of sum color of a block and hence adjacent blocks is thus **accomplished** in a line by line manner as the screen view 26 is refreshed. Stamp pixel...
...necessary blcok in ffomration is botained. As the stamp pixel colors are computed., they are **stored** in an adequately sized **RAM** , Thereaf ter, that **RAM** provides the display of the stamp image 34 throughout operation of the processing system 20.

Software Details
The features of system 20 (Figure 1) are provided by an Annotator-Desk **task** program 25 outlined in Figure 5.

The desk view 32 and functions corresponding therewith are...

...desk application routine 19 which is one of several application routines in the Annotator-Desk **task** program 25., a program which runs in an interrupt to or suspension of a previously running program. Other application routines in the Annotator-Desk **task** program 25 are for driving the annotator 21, or the printer 23, etc,

The relationship...

...in Figure 5.
An Applications Dispatcher (not shown) oversees all applications of the Annotator-Desk **task** . The Applications Dispatcher uses a set of codes agreed upon by all applications to determine...

...and other tablet driven
applications, the desk application routine 19 is formed of two subroutine **tasks** ., the supervisor **task** 15 (Figure 7) and table state diagram **task** 17 (Figure 8) described later, The supervisor **task** 15 and tablet **task** 17 share, and manipulate a desk database which holds the information that keeps track of...items,, and a file
in which the bitmap of the current desk view 32 is **stored** , Each entry 94 is doubly-linked list 92 describes an item in the desk view...

...item is specified in a respective field 100 (or is found implicitly through the physical **memory** address of the entry 94 in the case of a stamp) of entry 94 by...

...reordering entries 94.
Now making reference to Figure 7 and the operation of the supervisor **task** 15 of the desk application 19 (Figure 5), the basic purpose of the supervisor **task** 15 is to maintain the display of desk view 32. When the Applications Dispatcher gives control to the supervisor **task** 15, the supervisor **task** first determines if new documents and/or accessories and hence new stamps or icons need...

...updated display of the desk view 32
is provided on display unit 18, the supervisor **task** 15 adds to the In Box 63 of the user's system desk 36 the...

...annotator application 21 and/or note pad application 27 (Figure 5),, and enables the table **task** 17 (Figure 8).

Thereafter, the supervisor **task** 15 monitors the keyboard 12 (Fig, 1) for entry of requests for desired applications and monitors the tablet **task** 17 for activity. If there is no activity from either the keyboard 12 or the tablet 16 via tablet **task** 17 then the supervisor 15 checks for incoming mail and performs other procedures at 29 in Figure 7. If -there is incoming mail or other user desired **tasks** to be performed (such as satisfying an order/request for a new item from the system catalogue of desk-items),, the supervisor **task** 15 passes the necessary files and control to the Applications Dispatcher, Upon return, the supervisor **task** 15 begins anew and puts the new mail and/or new items in the In...

...in the case of some mail) and continues to monitor the keyboard 12 and tablet **task** 17,
When the tablet **task** 17 or signals from keyboard 12 indicate that the user has selected an accessory or processor operation other than a desk tool, the supervisor **task** 15 disables the tablet **task** 17 and passes to the

Applications Dispatcher an identifier of the selected processor operation and...

...operation is to operate. Thereafter the Application dispatcher processes the requested processor operation.

The tablet **task** 17 (Figure 8) follows the user's activity with the stylus 14 relative to table 16, The tablet **task** 17 is responsible for determining which icon or stamp was selected,, redrawing the necessary parts...

...desk took processor operation (such as mail, printer and trash barrel applications) to the supervisor **task** 15.

The tablet **task** 17 also determines which method of use of the stylus 14 the user is currently using.

The flow chart of Figure 8 illustrates operation of tablet **task** 17, When a user places an end 28, 30 of the stylus 14 on table 16 within sensing range of tablet 16,, the tablet **task** 17 displays an empty handed cursor to represent the present activity of the stylus 14...tablet position corresponding -to a stamp 34 or icon in desk view 32, the tablet **task** 17 tests at 33 in Figure 8 the pressure exerted on the active end of...

...stamp
34 or icon, If the pressure exerted exceeds a predefined threshold then the tablet **task** 17 determines on which stamp 34 or on which type of icon (i.e. application or holding member such as tray or folder) the stylus 14 is acting . This is **accomplished** by the tablet **task** 17 starting at the beginning of the linked list 92 (Figures 6a-6b) and checking...

...selected,
In the case of a stamp 34 being detected as the subject, the tablet **task** 17 then determines which method of use of the stylus 14 is being used by...

...Such displaying is handled by the annotation application routine which is called by the supervisor **task** 15 after the supervisor **task** 15 receives control from the tablet **task** 17. If the user does not lift his/her hand within that second, then the...hand 39,, if the user lists the stylus 14 from
table 61 . then the tablet **task** 17 is ended, In the case of having redrawn desk view 32 . tablet **task** 17 is ended after the selected entry 94 is added to the beginning of the...

...the
stylus 14, moves the stylus end 28, 30 along the tablet surface, the tablet **task** 17 displays a grasping hand cursor and moves the image of the stamp at 47...

...on top of a processor
operation icon of the activated with document type, the tablet **task** 17 at 49 passes to the supervisor **task** 15 the necessary information of the stamp and selected processor

operation to have that processor...

...operation. In the former situation, after the lifting of the stylus is detected.. the tablet **task** 17 determines whether the subject icon represents a processor operation which is selectable without a stamp, If so, then the tablet **task** 17 passes the necessary information and control to the supervisor **task** 15. otherwise the tablet **task** is ended and started anew with the detection of sufficient pressure an ...the touch and move mode with respect to the subject processor operation icon, then tablet **task** 17 provides for the display of the icon moving in correspondence to user movement of...
...is lifted such that the subject icon is placed on a stamp then the tablet **task** 17 determines if the subject icon represents a processor operation which, is activated with a stamp (the stamp being underneath the subject iicon). if so, then the tablet **task** 17 passes to the supervisor **task** 15 control and necessary information for processing the process operation corresponding to the chosen icon and stamp, The application routine subsequently called by the supervisor **task** 15 replaces the icon to its original loc7ation in desk view 32,
The foregoing moving of a stamp or icon during any part of the tablet **task** 17 is **accomplished** by known methods which display the whole object in motion from an initial position through...

...systems which utilize a mouse for input, Also,, the system desk may cooperate with application **software** other than the annotator, For example, the desk may serve as a filing system for conventional **word processing** and **spreadsheet software** ,
Claim
A **data processing** system comprising:
video display;
desk view particular to a user and displayed by the video...

...which provides a simulation of manipulation of sheets of information on a desk.

2 A **data processing** system as claimed in claim 1-wherein each data representation is a miniature of the represented displayable data,
3a A **data processing** system as claimed in Claim 2 wherein the processor means enables the user to stack...

...order in at least one pile and in various degrees of relative alignment.
4* A **data processing** system as claimed in Claim 3 wherein:
a plurality of data representations stacked in one...
...and
the processor means enables a bound pile to be moved as a whole,
A **data processing** system as claimed in claim 2 wherein:

the miniatures are formed in such fashion that
recognizable details of the displayable data are
retained in the miniatures.

6 A **data processing** system as claimed in Claim 1 further
comprising:
a stylus enabling a user to communicate...

...processor means different strokes representing various
forms of manipulation of a data representation,

7 A **data processing** system as claimed in Claim 6 wherein:
the desired displayable data is displayed in
full...

...a respective data representation of
the desired displayable data in the desk view.
8 A **data processing** system as claimed in claim 7 wherein:
the desired displayable data occupies substantially
the entire video display.
A **data processing** system as claimed in claim 7
wherein:
the user may employ the stylus to annotate the desired
displayable data.

10 A **data processing** system as claimed in Claim 6 wherein:
the desk view further provides moveable indicators of...

...view by a dragging of one end of the stylus on a
surface,
ill A **data processing** system as claimed in Claim 1 wherein:
the desk view further provides moveable
indicators
of...

...means performs the operation indicated by the
indicator on the represented displayable data.

12 A **data processing** system as claimed in Claim 11
wherein:
the **data processing** system further comprises a
stylus enabling a user to communicate to the processor
means ...of the stylus until the
data representation is positioned over the selected
'indicator.

13 A **data processing** system as claimed in claim 12
-wherein:
the positioning of the data representation is further...

...the
surface after the data representation has been
positioned over the selected indicator,

14 A **data processing** system as claimed in Claim 1 wherein:
the desk view further provides moveable
indicators of...

...performs the
operation indicated by the one indicator on the

desired displayable data,
15 A **data processing** system as claimed in Claim 1 wherein the desk view further provides an area for receiving data representations of displayable data to be newly possessed by the user.

16 A **data processing** system as claimed in Claim 1 wherein the displayable data which is represented by the data representations come in the alternative from within the desk view, from within the **data processing** system, or from a source external to the **data processing** system,

17 A **data processing** system as claimed in Claim 1 wherein: the desk view further provides representations of user...

...the processor means enables the user to spatially manipulate the holder member representations.

18 A **data processing** system as claimed in Claim 1 wherein:
the desk view furth6r provides moveable indicators of...corresponding group where the original pixels in the corresponding group have different colors,

23 A **data processing** system comprising:
processing means;
display means responsive to the processing means for displaying graphical representations...

...the graphical representation of the entity and removing the stylus from the surface,
24a The **data processing** system of claim 23 and ...the graphical representation of the entity and moving the stylus across the surfacet

25 The **data processing** system of claim 23 wherein:
the **data processing** system further includes annotation input means;
the user-activatable entities include a graphical@representation of...

...representation of displayable data by displaying the displayable data on the display means,

26 The **data processing** system of claim 25 wherein:
after the processing means displays the displayable data, the processing...

...responds to inputs from the annotation input means to annotate the displayable data,

27 The **data processing** system of claim 26 wherein:
the annotation input means includes the pointing device and
when...

...the

display which corresponds to the motion of the stylus' on the surface.

28 The **data processing** system of claim 27 wherein: the stylus has an other end and when the displayable...

...by erasing the portion of the line which is within the certain distance.

29 The **data processing** system of claim 24 wherein: the entities include a data entity containing data and a...

...perform function operation by performing the function entity's operation on the data.

30 The **data processing** system of claim 24 wherein: the perform function operation is further specified by raising the...

...representation of the function entity overlaps the graphical representation of the data entity.

31* The **data processing** system of claim 23 wherein: the entities include a function entity representing an operation of the **data processing** system and the processing means responds to an activation operation performed on the graphical representation of the function entity by causing the **data processing** system to perform the operation represented by the function entity.

32e The **data processing** system of claim 23 wherein: activation of an entity results in a graphic display of...

```
Set     Items   Description
S1    1116236   BRAINSTORM? OR BRAIN()STORM? OR PROBLEM()(SOLVE? OR SOLVING
           OR SOLUTION?) OR HASH()SESSION? OR CONFERENC? OR MEETING? OR
           COMMITTEE? OR GROUPTHINK? OR GROUP()THINK? OR TELECONFER? OR -
           VIDEOCONFER?
S2    4510449   THOUGHT()RESULT? OR IDEA? ? OR TACTIC? OR STRATEG? OR CONS-
           ENSUS? OR SOLUTION? OR RESOLUTION? OR RESOLV? OR DECISION? OR
           OBJECTIVE? OR TASK? OR AIM OR AIMS OR GOAL? ? OR ACCOMPLISH?
S3    1944281   COMPUTER? OR MICROPROCESS? OR MICRO()PROCESS? OR DATA()PRO-
           CESS? OR WORD()PROCESS?
S4     370425   TERMINAL? OR SERVER? OR DESKTOP? OR DESK()(TOP OR TOPS) OR
           WORKSTATION? OR WORK()STATION?
S5      35763   CPU OR CENTRAL()PROCESS? OR PROCESS?()UNIT?
S6     102448   CRT OR CATHODE()RAY()TUBE? OR DISPLAY?(2N)(MEDIUM OR MEDIA
           OR DEVICE? OR APPARATUS? OR SCREEN? OR MONITOR?)
S7     943527   MEMORY? OR STORE? OR STORING OR STORAGE OR RAM
S8    1386862   INTERNET? OR NETWORK? OR EMAIL? OR E()MAIL? OR LAN OR WAN -
           OR ETHERNET? OR INTRANET? OR EXTRANET?
S9     770751   SOFTWARE? OR SOFT()WARE? OR SPREADSHEET? OR SPREAD()SHEET?
S10     26526   (SELECT? OR PARTICIP? OR SUBJECT? OR THOUGHT?)(3N)(CELL? OR
            UNIT? OR BLOCK?)
S11    506615   MATRIX? OR MATRIC? OR GRID? ? OR CIRCLE()GRAPH? OR FAN()SH-
           APE?
S12   1314187   NARROW? OR ATTENUAT? OR FILTER? OR CULL? OR STREAMLIN? OR -
           STREAM()(LINE? OR LINING) OR PARE? OR PARING OR WHITTL? OR ED-
           IT??? OR REDACT? OR TRIM? OR PRUNE? OR PRUNING
S13   2736972   CONDENS? OR LIMIT? OR RESTRICT? OR REFIN? OR REDUC? OR DIS-
           TILL? OR BOIL?()DOWN OR ABBREVIAT?
S14    505754   RANK? OR SORT? OR HIERARCH? OR PRIORIT? OR CATEGORIZ? OR C-
           ATEGORIS?
S15    338065   COLOR? OR COLOUR?
S16   2599695   PLURALIT? OR MULTIPL? OR SEVERAL? OR MULTITUD? OR MORE()TH-
           AN()ONE OR "MORE THAN ONE" OR NUMEROUS? OR MANY
S17      8416   S1:S2 AND S3:S6 AND S7:S9 AND S10:S11
S18       148   S17 AND S3:S5 AND S6
S19        51   S18 AND S12:S14
S20        80   S18 AND S15:S16
S21       148   S18:S20
S22       124   S21 AND PY<2000
S23       124   RD (unique items)
? show files
File   1:ERIC 1966-2004/Jun 09
         (c) format only 2004 The Dialog Corporation
File   2:INSPEC 1969-2004/Jul W2
         (c) 2004 Institution of Electrical Engineers
File   7:Social SciSearch(R) 1972-2004/Jul W2
         (c) 2004 Inst for Sci Info
File  11:PsycINFO(R) 1887-2004/May W5
         (c) 2004 Amer. Psychological Assn.
File  35:Dissertation Abs Online 1861-2004/May
         (c) 2004 ProQuest Info&Learning
File  65:Inside Conferences 1993-2004/Jul W3
         (c) 2004 BLDSC all rts. reserv.
File  99:Wilson Appl. Sci & Tech Abs 1983-2004/Jun
         (c) 2004 The HW Wilson Co.
File 121:Brit.Education Index 1976-2004/Q2
         (c) 2004 British Education Index
File 233:Internet & Personal Comp. Abs. 1981-2003/Sep
         (c) 2003 EBSCO Pub.
File 256:SoftBase:Reviews,Companies&Prods. 82-2004/Jun
```

(c)2004 Info.Sources Inc
File 437:Education Abstracts 1983-2004/Jun
(c) 2004 The HW Wilson Co
File 474:New York Times Abs 1969-2004/Jul 19
(c) 2004 The New York Times
File 475:Wall Street Journal Abs 1973-2004/Jul 19
(c) 2004 The New York Times
File 583:Gale Group Globalbase(TM) 1986-2002/Dec 13
(c) 2002 The Gale Group
?

23/3,K/3 (Item 3 from file: 1)
DIALOG(R)File 1:ERIC

00551940 ERIC NO.: ED243950 CLEARINGHOUSE NO.: TM840265
Effect of **Computer** -Presented Organizational/ **Memory** Aids on **Problem Solving** Behavior.
Steinberg, Esther R.; And Others
24pp.
April 1984 (**19840400**)
NOTES: Paper presented at the Annual **Meeting** of the American Educational Research Association (68th, New Orleans, LA, April 23-27, 1984).
SPONSORING AGENCY: Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA. (BBB16628)

Effect of **Computer** -Presented Organizational/ **Memory** Aids on **Problem Solving** Behavior.
... **19840400**)
NOTES: Paper presented at the Annual **Meeting** of the American Educational Research Association (68th, New Orleans, LA, April 23-27, 1984).

This research studied the effects of **computer** -presented organizational/ **memory** aids on **problem solving** behavior. The aids were either **matrix** or verbal charts shown on the **display screen** next to the problem. The 104 college student subjects were randomly assigned to one of the four conditions: type of chart (**matrix** or verbal chart) and use of charts (optional or required). Students did eight problems in each of two sessions--an initial **task** and a transfer **task** . All subjects used the charts in the initial **task** and most did so in the transfer **task** . **Matrix** charts were perceived to be more useful than verbal charts although group performance scores were...

...score, the greater the probability that the chart was used. Performance scores on the transfer **task** improved significantly for students in optional conditions who were not at ceiling performance on the initial **task** . Subjects at different performance levels demonstrated knowledge of different **strategies** . (Author)
DESCRIPTORS: Charts; * **Computer** Assisted Instruction; *Display Aids; Higher Education; *Learning Activities; * **Memory** ; * **Problem Solving** ; **Recall** (Psychology); Retention (Psychology)
IDENTIFIERS: **Memory Tasks** ; Organizing **Strategies** ; Transfer Effect

23/3,K/47 (Item 42 from file: 2)
DIALOG(R)File 2:INSPEC

01060300 INSPEC Abstract Number: C77015710
Title: Evolutionary industrial software **display system (SYLVIE)**
Author(s): Gauget, R.
Conference Title: Convention Informatique. (Conference on Informatics) Part I p.199-201
Publisher: Convention Informatique, Paris, France
Publication Date: 1976 Country of Publication: France 220 pp.
Conference Date: 20-24 Sept. 1976 Conference Location: Paris, France
Language: French
Subfile: C

Title: Evolutionary industrial software **display system (SYLVIE)**
Abstract: The basic **objective** of the system is the supervision of an industrial process. It allows interactive images on a fixed ' **grid** ' to be displayed on a pseudo-graphic, polychromatic **CRT** . The displayed information (symbols or lines of characters) is variable both in form and/or appearance (**colour** , winking), depending on the state and/or the value of the associated variables. The **software** display unit includes: a monitor which manages the requests for images, up-dating and conversation by an assembly of **CRT** , keyboards and description facilities; and a set of image generation programs, working through **CRT** conversion or automatically from a data file.
Descriptors: **cathode - ray tube** displays...

... **computer software** ; ...

...process **computer** control
...Identifiers: **software** display unit...

... **CRT** ; ...

...industrial **software** display system
1976

23/3,K/106 (Item 48 from file: 233)
DIALOG(R)File 233:Internet & Personal Comp. Abs.

00239164 91LU04-006
Graphs to the future The Mobley Matrix analyzes the past to help plot the future
Jones, Susan Langford
Lotus , April 1, 1991 , v7 n4 p77-78, 2 Pages
ISSN: 8756-7334
Company Name: Mobley **Matrix** International
Product Name: Mobley **Matrix**

Graphs to the future The Mobley Matrix analyzes the past to help plot the future
Company Name: Mobley **Matrix** International
Product Name: Mobley **Matrix**
Presents a favorable review of Mobley **Matrix** ($895), a financial analysis **software** package from Mobley **Matrix** International Inc. of Los Angeles, CA (800). Runs on machines with 370KB of **memory** , 10MB of hard drive **storage** space. Says the **software** features six specialized graphs for formulating business **strategies** , is fun, has a print menu with two preformatted reports, and is best used by professionals as a supplement to financial statements; but does not support **desktop** publishing file formats for graphs, is not suitable for analysis of some aspects of the service-sector businesses, and has a steep learning curve. Includes two **screen displays** . (tbc)
1991
Descriptors: Financial Analysis; **Software** Review
Identifiers: Mobley **Matrix** ; Mobley **Matrix** International

```
Set     Items   Description
S1    4078696   BRAINSTORM? OR BRAIN()STORM? OR PROBLEM()(SOLVE? OR SOLVING
               OR SOLUTION?) OR HASH()SESSION? OR CONFERENC? OR MEETING? OR
              COMMITTEE? OR GROUPTHINK? OR GROUP()THINK? OR TELECONFER? OR -
              VIDEOCONFER?
S2   11547689   THOUGHT()RESULT? OR IDEA? ? OR TACTIC? OR STRATEG? OR CONS-
              ENSUS? OR SOLUTION? OR RESOLUTION? OR RESOLV? OR DECISION? OR
              OBJECTIVE? OR TASK? OR AIM OR AIMS OR GOAL? ? OR ACCOMPLISH?
S3    5927911   COMPUTER? OR MICROPROCESS? OR MICRO()PROCESS? OR DATA()PRO-
              CESS? OR WORD()PROCESS?
S4    2373954   TERMINAL? OR SERVER? OR DESKTOP? OR DESK()(TOP OR TOPS) OR
              WORKSTATION? OR WORK()STATION?
S5     186559   CPU OR CENTRAL()PROCESS? OR PROCESS?()UNIT?
S6     156502   CRT OR CATHODE()RAY()TUBE? OR DISPLAY?(2N)(MEDIUM OR MEDIA
              OR DEVICE? OR APPARATUS? OR SCREEN? OR MONITOR?)
S7    4227890   MEMORY? OR STORE? OR STORING OR STORAGE OR RAM
S8    6973981   INTERNET? OR NETWORK? OR EMAIL? OR E()MAIL? OR LAN OR WAN -
              OR ETHERNET? OR INTRANET? OR EXTRANET?
S9    4382535   SOFTWARE? OR SOFT()WARE? OR SPREADSHEET? OR SPREAD()SHEET?
S10     81436   (SELECT? OR PARTICIP? OR SUBJECT? OR THOUGHT?)(3N)(CELL? OR
               UNIT? OR BLOCK?)
S11    361337   MATRIX? OR MATRIC? OR GRID? ? OR CIRCLE()GRAPH? OR FAN()SH-
              APE?
S12   5715805   NARROW? OR ATTENUAT? OR FILTER? OR CULL? OR STREAMLIN? OR -
              STREAM()(LINE? OR LINING) OR PARE? OR PARING OR WHITTL? OR ED-
              IT??? OR REDACT? OR TRIM? OR PRUNE? OR PRUNING
S13   7192902   CONDENS? OR LIMIT? OR RESTRICT? OR REFIN? OR REDUC? OR DIS-
              TILL? OR BOIL?()DOWN OR ABBREVIAT?
S14   2339740   RANK? OR SORT? OR HIERARCH? OR PRIORIT? OR CATEGORIZ? OR C-
              ATEGORIS?
S15   1691931   COLOR? OR COLOUR?
S16     34399   S1:S2 AND S3:S5 AND S6 AND (S7 OR S9) AND S8
S17      4869   S16 AND S10:S11
S18      1142   S17 AND S12:S14(5N)S1:S2
S19       599   S18 AND S1 AND S2
S20       187   S19 AND (PLURALIT? OR MULTIPL? OR SEVERAL? OR MULTITUD? OR
              NUMEROUS?)(5N)S2
S21       135   S20 AND PY<2000
S22       110   RD (unique items)
? SHOW FILES
File   9:Business & Industry(R) Jul/1994-2004/Jul 19
         (c) 2004  The Gale Group
File  15:ABI/Inform(R) 1971-2004/Jul 20
         (c) 2004 ProQuest Info&Learning
File  16:Gale Group PROMT(R) 1990-2004/Jul 20
         (c) 2004 The Gale Group
File  88:Gale Group Business A.R.T.S. 1976-2004/Jul 19
         (c) 2004 The Gale Group
File 141:Readers Guide 1983-2004/Jun
         (c) 2004 The HW Wilson Co
File 148:Gale Group Trade & Industry DB 1976-2004/Jul 20
         (c)2004 The Gale Group
File 160:Gale Group PROMT(R) 1972-1989
         (c) 1999 The Gale Group
File 275:Gale Group Computer DB(TM) 1983-2004/Jul 20
         (c) 2004 The Gale Group
?
```

22/3,K/5 (Item 5 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

01408100 00059087
Lessons from a dozen years of group support systems research: A discussion of lab and field findings
Nunamaker, Jay F Jr; Briggs, Robert O; Mittleman, Daniel D; Vogel, Douglas R; Balthazard, Pierre A
Journal of Management Information Systems: JMIS v13n3 PP: 163-207 Winter 1996/1997
ISSN: 0742-1222 JRNL CODE: JMI
WORD COUNT: 19576

ABSTRACT: Researchers at the University of Arizona have built 6 generations of group support systems **software** , conducted over 150 research studies and facilitated over 4,000 projects. Lessons learned through that experience are reported. A theoretical foundation for the Groupware **Grid** , a tool for designing and evaluating GSS, is presented. Lessons are presented from 9 key domains: 1. GSS in organizations, 2. cross-cultural and multicultural issues, 3. designing GSS **software** , 4. collaborative writing, 5. electronic polling, 6. GSS facilities and room design, 7. leadership and...
...TEXT: years, researchers at the University of Arizona have built six generations of group support systems **software** , conducted over 150 research studies, and facilitated over 4,000 projects. This article reports on lessons learned through that experience. It begins by presenting a theoretical foundation for the Groupware **Grid** , a tool for designing and evaluating GSS. It then reports lessons from nine key domains: (1)GSS in organizations; (2) cross-cultural and multicultural issues; (3) designing GSS **software** ; (4) collaborative writing; (5) electronic polling; (6) GSS facilities and room design; (7) leadership and...

...8) GSS in the classroom; and (9) business process reengineering.

KEY WORDS AND PHRASES: group **decision** processes, group support systems, organizational role of information technology.

A GREAT DEAL OF WORK GETS...

... one person has all the experience, all the resources, or all the information needed to **accomplish** the **task** alone. And so teams form. Teams of people have successfully scaled seemingly insurmountable heights. But teamwork brings its own set of problems. Anyone who has suffered the grinding drudgery of **meetings** -without-end know how unproductive teamwork can be. Many things can go wrong with teamwork [83]. Participants may fail to understand their **goals** , may lack focus, or may have hidden agendas (figure 1). Some people may be afraid...

... through different interpretations of language, gesture, or expression. Besides being difficult, teamwork is expensive. A **meeting** of several managers or executives may cost upwards of$ 1,000 per hour in salary...

... alone. In Fortune 500 companies, as of 1988, there were more than 11 million formal **meetings** per day in the United States, more than three billion **meetings** per year. Managers spent about 20 percent of their time in formal **meetings** of five people or more, and up to 85 percent of their time communicating [66...

...Fortune 500 company reports losses in excess of $75 million per year due

to poor **meetings** .

For all its difficulty, teamwork is still essential; for all the expense, teams will not...

...still collaborate to solve tough problems. And, as business becomes more global in scope and **computers** become more ubiquitous in the workplace, the need for collaboration-and **computer** -based collaboration-will surely continue to increase.

Group support systems (GSS) are interactive **computer** -based environments that support concerted and coordinated team effort toward completion of joint **tasks** . Besides supporting information access, GSS can radically change the dynamics of group interactions by improving...

...and focusing problemsolving efforts, and by establishing and maintaining an alignment between personal and group **goals** . This paper presents a useful model for analyzing and comparing GSS technologies. It then summarizes...

... explain the diversity of contributions groupware can make to an organization. Toward that end, Groupware **Grid** can serve as a theory-based heuristic model for evaluating the contributions of groupware technology to team productivity (figure 2).

Team Theory and the Groupware **Grid**

The horizontal axis of the Groupware **Grid** derives from the Team Theory of Group Productivity [11]. Webster's Dictionary defines a team...
... Team Theory's deliberation construct asserts that people devote cognitive effort to forming intentions toward **accomplishing** the **goal** and includes the classic **problem - solving** activities: Make sense of the problem, develop and evaluate alternatives, select and plan a course...

... monitor results, and so on. The information-access construct addresses the attention demands of finding, **storing** , processing, and retrieving the information the group members need to support their deliberation. Team Theory...

... it is complete. However, the value of information is offset by the cost of acquiring, **storing** , processing, and retrieving it.

Team Theory also posits that the cognitive effort required for communication, deliberation, and information access is motivated by **goal** congruence-the degree to which the vested interests of individual team members are compatible with the group **goal** . Team members whose interests are aligned with those of the group will exert more effort to achieve the **goal** than those whose interests are not served by the group **goal** . The Groupware **Grid** does not address **goal** congruence because **goal** congruence may have more to do with the way a team wields the technology than...
...as: Figure 1. Teamwork Can Be Difficult

(Chart Omitted)

Captioned as: Figure 2. The Groupware **Grid**

Therefore, the horizontal axis of the **grid** addresses the potential for technology to reduce the cognitive costs of joint effort. Groups may and the Groupware **Grid**

The vertical axis of the Groupware **Grid** consists of three levels of group effort (figure 3). Sometimes a team may operate at...

... tool or an entire groupware environment can be mapped into the cells of the Groupware **Grid** . A given technology will probably provide support in more than one cell. The potential for productivity of different environments can be compared by comparing their respective **grids** . For example, a team database such as Lotus Notes offers little support at the concerted...

... input and anonymity communication interventions possible with GSS improve communication during a concerted effort. Each **software** tool in a GSS supports group deliberation in some unique way. A **brainstorming** tool, for example, prevents a group from thinking deeply, while encouraging them to diverge from familiar thinking patterns. An **idea** organizer, on the other hand, encourages a divergent group to focus quickly on a narrow...

...the technology was very easy to use.

We therefore developed the concept of the electronic **meeting** room and spent a decade researching the technology and techniques to make teams productive as...

...technology, we have discovered much about the nature of the interactions among people, technology, and **tasks** . Our research methods have included case studies, field studies, and laboratory experiments. The findings from ...

... upon having worked with more than 200 public and private organizations in our own four **meeting** laboratories, as well as at over 1,500 sites around the world that have been built upon the **meeting** laboratory model established at Arizona. We have facilitated or supported over 4,000 working sessions...
... modeled or measured in the early lab experiments, often because real groups do not perform **tasks** in a void, but within an organizational context that drives **objectives** , attitudes, and behaviors in group **meetings** . While working in the field, we learned a number of lessons about GSS and ...the study or other related limitations (see Table 1).

GSS and Organizational Buy-in to **Decisions**

The use of group support systems may increase the likelihood that participants will buy in to the final results of the group effort. For example, a **task** force in a large bureaucratic organization tried for over a year to draft a document...

...central administration to accept the same draft of the document, despite a long series of **meetings** . The team decided to bring representatives of the two groups to a GSS facility for another try. Using anonymous **brainstorming** , group writing, and electronic voting tools, the group quickly identified the key issues standing in the way of **resolving** their disputes. Within three days, the participants had negotiated their differences and rewritten the bulk...

... than is possible by conventional means. If the group is headed toward a clearly defined **goal** , the GSS can help achieve the **goal** more productively. If the group is unclear about its **goal** , the lack of direction will become immediately obvious when the team begins work. Undirected teams often abandon the **meeting** process within ten or fifteen

minutes, demonstrating that GSS use does not replace leadership but...

... and of organizational cultures, ranging from the fragmented to the cohesive.

GSS technology can help **resolve** counterproductive conflicts between leadership styles. One manager, who considered himself very democratic, presided over weekly 2 1/2-hour planning **meetings** with his staff. For the first ninety minutes, he would let the staff speak but...

...rose quickly, and the team prospered under a new, shared vision.

Failure to make a **meeting** 's **objectives** explicit can lead to disenchantment, particularly when participants spot phony democracy. If a leader includes a group in the **decision** -making process after the fact simply to "let them feel ownership," the group process breaks down. Leaders who merely want a team to understand a problem before they propose a **solution** should say so up front. If the **objective** is to develop a set of alternatives and recommendations, it should be so defined. Once the team has been commissioned to make a **decision** , however, a leader can contribute, advise, and argue, but the team will rebel against a...

... a project and to reveal underlying assumptions. When a national library attempted to develop a **computer** system, it assembled a team of representatives from different departments such as circulation, cataloging, acquisitions, and computing. For several **meetings** , the groups tried and failed to develop a shared vision of the project. The team...

...assumption-surfacing tool.

It turned out that the various departments had unrealistic expectations of the **computer** group, and the **computer** group had unrealistic expectations about the others. During the next few months, through vigorous and...

... as the artisan who wields it. This is just as true of sophisticated group support **software** as it is of a screwdriver. To realize these systems' enormous potential to expand the...

... of leadership, include greater group cohesiveness, better problem definition, a wider range of higher-quality **solutions** , and stronger commitment to those **solutions** . The tangibles, already demonstrated, are dollar savings through greater productivity and **reduced** staff hours to reach **decisions** . On the bottom line, more time is free from the demands of frequent-and often frustrating- **meetings** .

GSS and Participation in Organizational Activities

The members of teams that use GSS participate much...

... members in conventional teams. Laboratory experiments [13] and field studies [8, 73] have shown that **Pareto** 's law applies to conventional **meetings** : Fewer than 20 percent of the participants do more than 80 percent of the talking. People in GSS-supported **meetings** participate nearly equally and produce many more contributions than do people in unsupported **meetings** . Two key features of GSS may account for this increase in participation: anonymity and parallel...

... these characteristics may well resist actively participating in GSS sessions where information is shared and **ideas** are contributed anonymously. It is important that organizational incentives and rewards be

aligned with GSS...
...Lessons about Anonymity

Laboratory studies have shown that groups using GSS produce many more unique **ideas** of higher quality than groups using standard **meeting** techniques [27, 33, 34]. Further, laboratory studies have shown that teams using anonymous GSS technology contributed many more **ideas** when they were allowed to enter both positive and negative comments [18]. Theory suggests [29], and field experience confirms, that anonymity frees people to explore or to criticize **ideas** without fear of retribution from peers or superiors. Anonymity encourages people to participate in generating **ideas** without inhibition. A manager at Hughes Aircraft observed, "People who are usually reluctant to express...

...feel free to take part, and we've been surprised by the number of new **ideas** generated. We also reach conclusions far more rapidly."

Anonymity is a continuous rather than a...

... and GSS facilitators have found ways to manipulate varying degrees of anonymity to achieve their **goals** . For example, a GSS can be used to support discussion without identifying individual comments. While...
... aliases. Alternatively, participants can have their comments labeled by their subgroup membership (e.g., teachers, **parents** , administrators at a PTA **meeting**) so subgroup membership is pegged to a comment, and hence the position that participant is...

...of such disintegration. This does not mean, however, that people are not critical in electronic **meetings** . They are. Participants will often raise issues that would never come out in face-to...

... in an anonymous electronic criticism than in a direct rebuke during a face-to-face **meeting** . The screen buffers the negative emotions that may accompany such criticism. Because nobody knows where a particular **idea** came from, people criticize the **idea** rather than the person who presented it. Still, we have seen bruised egos and people struggling with honest feedback.

Anonymity may also encourage group members to view their own **ideas** more **objectively** and to see criticism as a signal to suggest other **ideas** . "I wasn't as uncomfortable when I saw someone being critical of someone else's **idea** , because I thought 'Nobody's being embarrassed here at all,"' says Sam Eichenfield, president and CEO of FINOVA.
"I noticed that if someone criticized an **idea** of mine, I didn't get emotional about it," says the Hughes Aircraft manager. "I...

...boss say, 'You are wrong,' it's a slap to you, not necessarily to the **idea** ."

Despite the safe haven it provides for most participants, GSS is not always comfortable for...

... takes courage for a manager to deal with the issues that surface in an anonymous **meeting** . It is difficult to deal with unpleasant input, but if problems lie buried for too...

... personnel from multiple levels in the organization for a GSS session. Thirty minutes into the **meeting** , he turned red in the face and stood up. Pounding a fist on his PC...

... a week's reflection, he returned sheepishly to the group and said, "I had no **idea** there was trouble. I guess I'm more out of touch than I ought to be. Let's try again."

Anonymity helps to separate **ideas** from the politics behind them. **Ideas** can be weighted on their merits rather than on their source. Each member of a...

... own perspective, often to the detriment of the project or enterprise. For example, in traditional **meetings** , engineers see engineering **solutions** , salespeople see marketing **solutions** , and production people see manufacturing **solutions** . In anonymous discussion and exchange of **ideas** from many different viewpoints, the big picture is more likely to emerge. GSS groups often achieve a unified, shared vision of problems and **solutions** something that's difficult with traditional **meeting** methods.

GSS and Productivity

(Table Omitted)

Captioned as: Table 2. Lessons about Participation in GSS...

... often quickly promoted, leaving nobody with the skills to run the group support system. One **solution** to the problem is to make sure that there are always several apprentice facilitators in...

... company of its GSS expertise. One general in the Marine Corps adopted quite a different **strategy** . He insisted on being the first person trained with the GSS and ran all the early **meetings** himself. He reasoned that nobody would be able to claim GSS was too hard to...

... of patterned ways of thinking, feeling, and reacting with the use of GroupSystems for various **tasks** in international contexts is an emerging area of study. Hofestede applied the concept of power...

... behavior patterns within different national cultures. Because distributed GSS has the potential to make multicultural **meetings** more common, researchers have begun to explore the implications of technology mediated cross-cultural collaboration...

...participate effectively and efficiently in collaborative activities with high levels of personal satisfaction.

Cross-cultural **meetings** introduce the problem of participants having different native languages. Participants in cross-cultural sessions can... showing more resistance to change. In addition, Griffith found generational differences in using GSS in **problem - solving tasks** by Bulgarian **meeting** participants. She hypothesized that the difference was due to the changing political climate in Bulgaria...
... have had no experience. It is especially important when using student subjects to use relevant **tasks** and established relationships whenever possible.

Lessons from the Field

(Table Omitted)

Captioned as: Table 3...

...Interestingly, cross-cultural use of GroupSystems is more notable for

similarities than differences, especially for **idea** generation. Use of GroupSystems around the world tends to be fundamentally similar to its use ...

...as facilitation and technological substitution of audio and visual cues. Integration of GroupSystems with video **conferencing** is a special use that we expect to emerge. Virtually nothing so far is known about the need for video **resolution** as a function of the availability of GroupSystems features. The group and organizational benefits of combined use of video and Group Systems are compelling but unproved.

Lessons about GSS Application **Software**

The core of the group support system environment is collaborative **software** . The collaborative **software** developed at Arizona is GroupSystemsTM. Over the years, through six generations of GroupSystems development, we have learned a number of lessons about what is important for successful GSS **software** in terms of structure, use, and interface (Table 4).

The Values of Modularity

It turns out to be very useful to build GSS **software** into a collection of special-purpose modules rather than as a single unit. Although it is possible to build a single tool that can be used for **idea** generation, **idea** organization, **idea** evaluation (polling), and **idea** exploration, toolkits are more flexible than indivisible systems and increase the potential for tool reuse for a variety of **tasks** -including new, unanticipated **tasks** [61]. New collaborative tools should take advantage of recent advances in distributed object architectures and...

... Subtle differences in user interfaces can make large differences in group dynamics. For instance, an **idea** -generation tool with a five-line limit for comment encourages concision and enables a group to explore a broad range of **ideas** quickly. On the other hand, an **idea** -generation tool that permits long comments about a few items will encourage in-depth examination...

... 15]. Group members must talk, listen, think, and remember what has been said. If the **computer** interface poses an additional distraction, it will hurt rather than help group productivity. Individuals have...

... understanding the user interface, the less effort they will be able to spend on the **task** at hand [11]. In EMS development, we attempted to create tools that would permit groups...

... instructions [23]. Participants are often able to begin work with no instructions at all. We **accomplished** a short participant learning curve by offloading much of the complexity onto the facilitator but...

... lengthy facilitator learning curves discouraged large-scale adoption of GSS tools and are now seeking **solutions** that will also shorten the facilitator learning curve.

Provide Both Structure and Flexibility
(Table Omitted)

Captioned as: Table 4. Lessons about GSS Application **Software**

Successful **meetings** require both structure in the group's approach to its **task** and flexibility in adjusting its approach as new information is introduced. Group support systems **software** must provide for both faces of

this paradox.

Structured ...participants to contribute their knowledge and opinions in a minimum amount of time [25]. Electronic **brainstorming** , for example, inhibits participants from thinking deeply by limiting comment contributions to five lines. The...

... called ICOMs (input controls output mechanisms) to six per tree level [23].

Group support systems **software** allows pre-planning of a **meeting** agenda in which each group **task** is mapped to a specific set of **software** tools. This pre-session **task** mapping forces the group to think through its **meeting objectives** more specifically than it might otherwise do. Several **meeting** leaders have reported that pre-session agenda building has improved their **meetings** [24, 55].

On the other hand, the group support system must allow the agenda to be changed on the fly should the flow of the **meeting** require such action. The toolkit structure of a group support system permits altering a **meeting** process in midstream and switching to a different tool. The GSS toolkit should have an...

... to the next. For example, if a group spends time generating a broad set of **ideas** and then wants to evaluate which **ideas** are best, it must be possible to move the **ideas** to the voting module. Long or awkward transitions between modules will disrupt the group dynamics...

... tools wherever possible. It is useful to be able to move information to and from **spreadsheets** , text editors, databases, and other individual productivity applications.

Lessons Yet to be Learned about GSS...

...new research opportunities and demands. As shared distributed workspaces are increasingly occupied by multiple synchronous **computer** users, GSS researchers need to join with the human- **computer** interface (HCI) community to develop truly collaborative user interfaces that seamlessly support concerted work. Much...

... their colleagues in the field of communications must investigate which nonverbal behaviors are key to **computer** -supported concerted work and then learn to embed those nonverbal cues into the **software** .

Related to this is the challenge of extending VR environments to become GSS tools. Most early VR environments contain minimal **task** and process structuring; they are simply open-ended conversational spaces. GSS researchers must work with VR developers to embed GSS **task** and process structures into these environments. Collaborative Writing

A significant body of literature describes the...

... first to work independently, combining their work in an editing stage. More than two dozen **computer** -based group editing tools have been developed in the past decade. Sharples [82] identify three categories of group editing processes:

Sequential **editing** : Collaborators divide up the **task** so that the output of one stage is passed to the next writer for individual...
... called markup tools. Examples of these include ForComment, as well as

recent extensions to popular **word - processing** programs such as Microsoft Word and Lotus WordPro.

Parallel **editing** : Collaborators divide up the **task** so that each writer works on a different part of the document at the same...

... Olson et al. [63] used the ShrEdit text editor to support groups engaging in the **task** of designing a post office. However, this is essentially an alternative generation and evaluation **task** , not a documentation **task** . While the authors found that groups using their text editor generated longer recommendation documents than...

...Significant Productivity Gains

In groups that have achieved significant productivity gains through use of a **computersupported** collaborative writing process, the gains seem to derive from a variety of factors. First, the... when each author individually reviews a draft, there is little chance to communicate, negotiate, and **resolve** issues. **Multiple** review passes are often required before an issue can be **resolved** -if it ever can be.
For example, one federal government agency team was updating a...

...Eight months into the project, the team met face to face for a one-day **meeting** but were unable to **resolve** the disputes over sections of the document. Another draft was attempted but received little support...

... it demonstrates the high level of shared buy-in the authoring team achieved.

An Appropriate **Task** Process Is Vital to the Success of the Writing Project

Early attempts at collaborative writing...

...70] with proscriptive GSS interventions at each of six stages:

1. Open discussion: Develop the **objectives** and general scope of the document using **brainstorming** or parallel discussion **software** .

2. Generation of document outline: Develop main sections and subsections that will provide the structure...
...consist of a few people or in some cases may be only one person. The **task** is to take the content entries from a section and organize, edit, and complete the...

...may be limited and valuable, it is used as much as possible to add and **refine** document content. Formatting can be **accomplished** after the fact by team members or an outside editor.

The key lesson here is...

... to improve the collaborative writing process. However, GSS technology can be combined with a tight **task** and process structure to produce significant gains.

Addressing Interpersonal Issues

Disputes often arise during collaborative writing sessions. The process described above helps to identify, focus, structure, and thereby to **resolve** disputes. Often, disputes arise when team members have incorrect

or incomplete information. Occasionally, disputes arise...Collaborative Writing
Most of our synchronous collaborative writing work to date has been within one **meeting** room. We, and other researchers, have little to no experience yet at supporting synchronous distributed...

...this assertion.

Lessons about Electronic Polling

Researchers have, for many decades, examined ways to use **computers** to assist groups in **decision** -making processes [45, 47, 48, 51, 52, 53, 68, 77, 78, 79]. Early attempts, however, at linking **computer** technology with a group process, such as MacKinnon's use of an off-line FORTRAN...

...their algorithms or their concepts, but rather to the lack of synergy in the human- **computer** interaction. Even today, the central problem remains enhancing the group process so that members' outputs, in real time and naturally, become inputs for **computer** processes and vice versa [4]. However, isolated successes [85] presage great potential for **computer** -based analytical tools to assist groups in arriving at a better understanding of the problem...

... form a group ranking from a set of individual rankings. However, with the advent of **networked computers** and algorithms, which provide real-time access to informational databases, support for pre- and post- **decision** group discussions, immediate feedback, and tools to fully analyze the **decision** process, electronic voting is now emerging as a separate stream of research, one with neoteric...

... 45, 56]. Electronic voting, however, tends to inspire a "vote early, vote often" mentality within **decision** groups. Because it is fast and meets the usual GSS criteria of preserving anonymity, granting...

... members, and mitigating the effects of irrelevant influences, teams may use electronic voting to measure **consensus** and focus subsequent discussion, rather than to close debate [4]. In these ways, a more...

... use electronic polling tools. Teams find that polling clarifies communication, focuses discussion, reveals patterns of **consensus** , and stimulates thinking [67, 92] (Table 6).

The following case studies, taken from confidential research...

... eighty-nine technical researchers on the company's payroll. When they finally completed this arduous **task** , a new vice president rejected the process they had used. This vice president didn't...

...allowed a fuller expression of those opinions.

An outside consultant was hired to engineer a **computer** -supported voting process. The new scheme required each participant to submit both a ranking of...

... several different graphical analyses of their votes and found a great deal of confidence and **consensus** on some of the **rankings** , and a great deal of variation on others.

Subsequent discussion revealed that many managers did...

... discussion and information sharing, the group voted again; this time they achieved a much stronger **consensus** . After the second vote, the group discussed their remaining differences and in short order arrived...

... of their technical staff with which all participants could live. They agreed that the new **computer** -supported voting ...than traditional voting methods and that it inspired a more open and focused exchange of **ideas** . What was more important, everyone from the vice president down felt that the new rankings...

... case, many GSS-supported voting experiments have found that weights improve the efficacy of the **decision** method [5, 45]. As Ferrell [31] points out, weighting methods may not have been tested...

... source of the conflict and decided to conduct an experiment. Approximately 200 people attended a **meeting** where every participant was given a hand-held, radio-linked voting box. Using a large public **screen** , a facilitator **displayed** a number of policy statements such as, "When patients need emergency care it shall be...

... voted by agreeing or disagreeing with each statement as it was displayed.

Prior to the **meeting** , it was assumed throughout the health-care organization that doctors, as a group, were responsible...

...the directors that the doctors were causing problems.

A parallel situation occurred at a board **meeting** of a major nonprofit organization. As its group of twelve executives prepared a five-year **strategic** plan using a GSS, they reviewed funding for each activity supported by the organization. One...

... are puzzling over a report of the spread of electronic votes. Traditional methods of measuring **consensus** that do not reveal **group thinking** patterns can prove costly. The head of a mining company used a **computerized** voting system for the politically highly charged **task** of allocating a budget across **multiple** corporate sites and projects. He asked a number of key executives for their opinions, but...

... the various projects and sites, and the subsequent vote-and-discuss cycle resulted in high **consensus** on the budget allocation. As the team left the room, one of the vice presidents...

...had simply taken a chance.

No More Mr. Nice-Guy

Electronic polling can sometimes facilitate **decisions** that are too painful to arrive at using traditional methods. A corporation with a particularly...
...an electronic polling system to help decide the best way to downsize. In many previous **meetings** , the possibility of eliminating a large but ineffective division was raised but was set aside...

... hurt the manager's feelings by pushing division's elimination. Instead, using tradimethods, the group **consensus** indicated that across-the-board cuts should ...cuts to mission-critical functions, and at the same time it distributed responsibility for the **decision** among the participants.

Limits on Electronic Voting

Not all electronic voting sessions are successful. Occasionally, when all the votes...

...its survival. During most of the discussion, people were optimistic that they would reach a **consensus** and proceed accordingly. Rather than converging, however, group members' views diverged as electronic voting proceeded...

...Lessons Yet to be Learned about Electronic Polling

In addition to making face-to-face **meetings** more productive, electronic voting plays a critical role in supporting geographically dispersed **meetings** . Remote **meeting** participants lack such nonverbal cues as shifting gazes, body positions, and gestures that let speakers...

... voting schemes and response analyses to clarify communication and focus discussion consistently reach higher-quality **decisions** than groups using traditional voting methods [5]. Electronic tools that permit any participant to change...

...real-time display of group voting patterns establish a different dynamic by indicating shifts in **consensus** . New **networkbased** voting schemes permit a group to begin interacting long before participants arrive in the **meeting** room, and to extend interaction beyond the face-to-face **meeting** .

Lessons about the GSS Facilities and Room Design

The importance of the physical environment to the process and outcomes of technology-supported **meetings** has been reported in the GSS literature by several authors [62, 63, 64, 89]. GSS...

... range from the spartan to the opulent, from the inexpensive to the extravagant. An electronic **meeting** room need not be expensive to be successful, but we have learned from designing and using technology-supported **meeting** facilities that fundamental design considerations can enhance the impact of the technology on the **meeting** process (Table 7).

The Public Screen

Most GSS facilities include one or more public screens...

... the second screen to support electronic slide shows, provide a group view of a participant **screen** , **display** two different views of shared information, or bring an external document into public view. Multiple public **screens** **displaying** a single image may also improve viewing angles and shorten viewing distance for **meeting** participants.

Lighting Is Critical

The quantity and quality of lighting significantly affect both the performance and the satisfaction of workers [40, 87, 93]. The introduction of **computer** technology complicates the delivery of appropriate lighting [1, 69]. It is difficult to strike a balance between adequate lighting and the need to view a public screen. Standard office and **conference** space buildouts often include only fluorescent lighting, which washes out a front projected display. Optimal technology-supported **meeting** facility lighting

balances the need for a clear bright public display with adequate **workstation** **task** lighting. And these two needs must be considered independent of the delivery of ambient lighting. The variety of **tasks** that occur during group support systems sessions requires multiple coordinated lighting systems in the room. There are several choices **meeting** -room designers can make to provide for better lighting:

Use indirect rather than direct systems to minimize glare;

Provide individual **task** lights with parabolic louvers;

Use dark matte surfaces on countertops to reduce glare;

Provide rheostat controls for variable dimming;

Provide easy-to-use presets for the **meeting** leader.

Lighting is not only an environmental hygiene consideration; it can also be used by a **meeting** facilitator to focus group attention, affect group mood or energy, and communicate acceptable norms of...

...as a nonverbal signal to a group when it is time to focus on their **computer** screens and when it is time to communicate verbally.

Seating Configuration

The first GSS facilities...

... This configuration allows a reasonably good line of sight among participants and of the public **display** **screen** at the open end of the horseshoe. It also allows the facilitator to step into...ofthe facility and to decide the relative importance of group focus, access to the public **display** **screen** , and support for large group size. Lines of Sight and the Work Surface

Some consideration...

...that will be made available to the participants, who must be able to see their **computer** screen clearly and they must also be able to see one another clearly. In some electronic **meeting** rooms, the CPUs sit on **desktops** with the monitors on the CPUs, resulting in a "Kilroy" effect. People strain to see...

... proceedings; they lose interest and participation drops. Ideally, monitors should be partially recessed into the **desktop** so people have clear lines of site to one another. Some room designers have buried the monitors under a glass panel in the **desktop** , freeing the entire surface. This approach, however, is a mixed blessing because lights and windows create glare on the glass. Further, if this **solution** is chosen, care must be taken that shorter **meeting** participants have a clear line of sight to the embedded monitor once they pull out their keyboard drawer.

(Table Omitted)

Captioned as: Table 7. Lessons about Technology-Supported **Meeting** Facilities

In recognition that it is difficult to keep the monitor viewing area free of papers and clutter during the **meeting** , the partially embedded monitor is a good compromise [54]. Along with space for the monitor...

... at least two full-sized sheets of paper. Despite good intentions of providing for paperless **meetings** , participants often need to work from documents while interacting in an electronic **meeting** room. We have been designing millwork to provide for at least eleven inches between the front of the **workstation** and the base of the monitor to allow room for a sheet of paper in...

... is often important to include social space along with the work space in a technologysupported **meeting** facility [57, 69]. We have built technology-supported **meeting** facilities to support GSS **meetings** that last a full day or several days. When a **meeting** will last longer half a day, consideration must be given to supporting both group process...

... individual needs. Most facilitators will use a variety of group process techniques during a lengthy **meeting** to keep a group fresh and focused. Facilitators may wish to break the group into...

... and caucusing can often lead to breakthroughs that are difficult to achieve during a formal **meeting** protocol. The physical environment can support this by providing cozy nests, nooks, and crannies for...

... noise for acoustical privacy. One facility at Arizona has an outdoor fountain just outside the **meeting** room. The running water provides white noise that ensures acoustical privacy for small groups during...
... small caucuses. Too often, technologysupported physical environment design projects are defined to be just a **meeting** room, and such vital spaces are overlooked.

Minimizing Ambient Noise and Providing Effective HVAC

Motors and fans on **computers** and projection equipment in a technology-supported **meeting** facility add both significant heat and noise to the environment. The quality of the ambient...

... 80] and workplace satisfaction [16, 43, 80], and too much heat or humidity can damage **computer** equipment, and dust, smoke, or static electricity can damage data- **storage** equipment.

An effective heating, ventilation, and air conditioning (HVAC) system is critical to the success of a technology-supported **meeting** facility [54]. The exact amount of cooling required for a given facility will depend upon ...

... specific equipment chosen, and the amount of sunlight or other external heat sources present. Design **solutions** include a stand-alone HVAC system, using air filters in an existing system, and installing...
... if the central building system is down, as well as providing for finer tuning of **meeting** -room temperature and humidity controls.

Whether it is centralized or stand-alone, the HVAC system...

... HVAC systems often include fans to move air and may produce significant ambient noise. One **strategy** used at Arizona to **reduce** this noise has been to place the HVAC returns beneath the **computer** millwork. Fresh cool air is dropped from the ceiling, as cool air naturally falls. Vents in the millwork accept the cool air, which then falls past the **computer** equipment and is sucked into floor ducts beneath the millwork. The heated air is removed from the environment without ever passing the **meeting** participants. In addition, much of the ambient noise generated by the

computers is taken out along with the air.

Lessons Yet to Be Learned about GSS Facilities...

...in physical space.

Lessons from Facilitators and Session Leaders

The person who chairs an electronic **meeting** is the leader or facilitator. This person may be the group leader, another group member...

...A nonmember can be a specialist in GSS and group work but may lack the **task** and group knowledge of a regular member. The **meeting** leader/facilitator provides four functions: First, he or she provides technical support by initiating and terminating specific **software** tools and functions and guiding the group through the technical aspects necessary to work on the **task** . This removes one level of system complexity and thereby reduces the amount of training required...

...attention to both the group and the technology, sometimes simultaneously [10] (Table 8).

Second, the **meeting** leader/facilitator chairs the **meeting** , maintains the agenda, and assesses the need for agenda changes. The leader may or may not take an active role in the **meeting** to improve group interaction by intervening to provide process structure in coordinating verbal discussions, for...

... This person also administers the group's knowledge. In a GSS designed without support for **meeting** leaders/facilitators, any group member may change or delete the group **memory** . When disagreements arise, competition among members for control can create dysfunction. While this is manageable ...

... where competitive political motives and vested interests exist. With GSS, members can view the group **memory** and add to it at their own **workstations** . On the other hand, when desirable, only the **meeting** leader/facilitator can modify and delete public information.

Third, the **meeting** leader/facilitator assists in agenda planning by working with the group and/or group leader to highlight the principal **meeting objectives** and develop an agenda to **accomplish** them. Specific GSS tools are then mapped to each activity. Finally, in an ongoing organizational setting where the **meeting** leaders/facilitators are not group members, the **meeting** leader provides organizational continuity by setting ground rules for interaction, enforcing protocols and norms, maintaining the group **memory** repository, and acting as champion/sponsor. The roles of the **meeting** leader/ facilitator may also change over time. For example, after a group has some experience...

...Plan the Agenda Carefully in Advance

The most basic principle for successful use of electronic **meeting** systems is that the **task** must be very clearly defined and meaningful to the group and the activity in which its members engage must obviously advance them toward **accomplishing** that **task** . Whereas a conventional **meeting** may wander for three or four hours before people realize it is off track, a GSS **meeting** can resemble a train wreck in a small fraction of an hour if it is...

...concrete deliverables the group will create-be it a problem statement, a list of possible **solutions** , a documented **decision** , a plan of action, or whatever. Defining a deliverable can in itself be a difficult **task** , but without it an electronic **meeting** is likely to founder. The group leader and facilitator must decide on a process for...

...and the different dynamics each can produce. Having mapped out a process for achieving the **goal** , the leader must also be sure that the appropriate people are invited to-and will attend-the **meeting** . Any group that has a stake in the outcomes can and should be represented. This is much more feasible with electronic **meetings** than with conventional **meetings** because GSS **meetings** can include many more people without hampering group productivity and can also provide support to...thinking. GSS enable groups to be distributed among different modes of interaction in that the **software** can be used to blend parallel work into a single group repository. In addition, GSS...

... discussion among participants with subtle verbal cues and with switch selection choices in the GSS **software** . For example, if the facilitator wants participants to respond to one another, the GSS discussion...

... number. On the other hand, if the facilitator wants participants to focus attention on developing **ideas** already presented and to discourage cross-discussion, he or she can turn off the comment...

... use of electronic communication technologies does not eliminate the power of nonverbal communication in the **meeting** room. The facilitator must be careful about delivering nonverbal cues. Position in the room, posture...

...is ready to move on.

A facilitator can implement structure and training choices during a **meeting** to affect the degree to which participants' verbal input is conversational in tone. If the facilitator wants participants to brain-dump **ideas** into the shared group **memory** , he or she can structure the GSS to include many parallel topics in tandem. If the number of topics is more than one-third the number of **meeting** participants, it will be difficult for participants to focus on what other participants are saying; they are then likely primarily to dump their own **ideas** into the repository. In addition, if the facilitator wants to stress interactive discussion among participants...

...performance. One recent experiment [84] found that the facilitator could boost group performance in an **idea** -generation **task** by an average of 30 percent simply by changing two phrases in the instructions to...

... of"below average" should their performance flag. This small example illustrates a key point: GSS **meeting** tools, like the tools of a craftsman, must be used with skill and understanding. The...

... expert systems tools might be introduced into the session-planning process to help facilitators design **meeting** agendas and choose GSS tools. **Software** wizards might be introduced to guide the facilitator in real time during **meetings** at tool selection or group process awareness. Additional tools could monitor online group processes and...

... GSS are implemented as distributed systems, more facilitators will be called upon to lead distributed **meetings** . Little research has yet been undertaken to understand and improve the process of distributed

facilitation... stage," delivering information, the instructor became the "guide on the side," leading students through the **problem - solving** process and directing them toward useful information. The problems were framed such that the students perceived a vested interest in the **resolution** . The instructors chose problems carefully so students had to learn what the teachers wanted them...

... the podium and able to work with learners one-onone as the class sought a **solution** .

At Orr Elementary School in Anacostia, Washington, DC [12, 90], 64 percent of the learners...

... The instructor guided the students through the process of solving that problem. They used electronic **brainstorming** to generate reasons why Jordan might be persuaded to come. The instructor's writing activity...

...process for the students. Then the instructor asked the students to draw from the same **idea** pool to compose individual letters to the athelete. The students enthusiastically proceeded to write.
Their...

... deliver information. She offered problems the students considered important and guided them as they sought **solutions** . She suggested where they could find information (the poster) and helped them apply the information...

... school, and undergraduate levels. Pupils at all levels engaged successfully in the problem-based learning **strategy** . Their reading, writing, argumentation, **problem - solving** , and teamwork skills improved substantially; and a number of practical lessons emerged.

Vested Interest Motivates...

... participants launch vitriolic personal attacks full of swear words and obscenity. Buffoonery is jocular off- **task** comments meant to disrupt or distract the group.

Several strategies for **reducing** flaming emerged. One instructor empowered all learners to delete contributions that offended them. Another asked all students to tag their contributions with a **matriculation** number. This identified the learners to the teacher, but not to one another. Several teachers... back one or more grades, so they may have brought more developmental maturity to the **tasks** in which they engaged.

New Technology Can Be Tough on Teachers

Students in these studies...

...First, teachers already have a very demanding job, yet them to build and maintain the **computer networks** upon which the technology ran. Their schools were not attuned to the need for technical...

... that teachers do not have enough time both to run their classes and to maintain **networks** . Long-term **solutions** will require that the functions be separated. Systems must be configured so that teachers can...

... delivery specialists but thinking of themselves instead as mentors to learners on a quest toward **goals** important to the learner. Only after they gained experience with GSS did they begin to...

...help teachers plan online activities.

Teacher Interfaces Must Be Simple
It has long been the **goal** of GSS developers to make interfaces so simple that novices can begin work with less...

... teachers needed interfaces that impose substantially lower cognitive loads than do the facilitators of managerial **meetings** .

Lessons Yet to Be Learned about GSS in the Classroom

While early studies suggest that...

... Arizona has used GSS tools and methodologies with numerous government and private organizations seeking to **accomplish** BPR/BPI (Table 10).

GSS Supports Large Heterogeneous Reengineering Teams

One of the most consistent...

... that both large and small groups whose members come from all organizational levels can successfully **accomplish** BPR/BPI. Using GroupSystems in combination with specially designed facilitation protocols enables diverse and often...
... to be summarized and integrated. It is easy to develop a relatively complete product with **consensus** and buy-in of subgroup members in a session that does not travel well beyond...

... to provide briefing packages that session participants can use to promote change.

Special-Purpose GSS **Software** Is Advisable

BPR/BPI modeling processes require structures that do not exist in most GSS **software** packages. A desirable feature is specific tree and **network** structuring with rule or consistency checking. Graphical representation of this information is also extremely helpful...least competent workers. The GSS BPR/BPI sessions allowed the same modelbuilding work to be **accomplished** in about two weeks, and managers were consequently more willing to assign their more vital...

... for a geographically separated team? A great deal of research has been done on electronic **brainstorming** and **idea** generation, yet **idea** generation is only a small part of the overall effort of a team engaged with...
...likely bring some answers, and many more questions.

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In 1996, Dr. Nunamaker received the DPMA EDSIG Distinguished IS Educator Award. The GroupSystems **software** resulting from his research received the Editor's Choice Award from PC Magazine, June 14, 1994. At the Group Ware 1993 **Conference** in San Jose, he received the GroupWare Achievement Award along with recognition of GroupSystems as...

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Electronic meeting **systems to support group work.**
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Electronic meeting **systems to support group work.**

ABSTRACT: An Electronic **Meetings** System (EMS) provides a new type of **meeting** environment. Each participant is stationed at a **computer terminal** and contributes to the **meeting** by typing comments into the **terminal** . The **computer** then processes the comments and displays them. All members' comments have the same weight and...

...larger groups can work together effectively, outside information is easily accessible and an automatic organizational **memory** is generated. Disadvantages are that anonymity may mean that individuals may not participate at all...

TEXT:

Almost every time there is a genuinely important **decision** to be made in an organization, a group is assigned to make it--or at...

...one group, typically several groups at any point in time. Groups communicate, share information, generate **ideas** , organize **ideas** , draft policies and procedures, collaborative on the writing of reports, share a vision, build **consensus** , make **decisions** , and so on.

However, group **meetings** are often not as effective as they could be [42]. **Meetings** may lack a clear focus. Group members may not participate because they are apprehensive about how their **ideas** will be received or because a few members dominate discussions. Hidden agendas may promote political **decisions** that are not in the best interests of the organization. **Meetings** may end without a clear understanding or record of what was discussed. Yet in spite of these problems, little **computer** support is available for **meetings** --which is somewhat surprising given the ubiquitous nature of **computer** support in modern organizations.

A new form of **meeting** environment, which we term an Electronic **Meeting** System (EMS), has emerged which strives to make group **meetings** more productive by applying information technolgy. EMS technology is designed to directly impact and change the behavior of groups to improve group effectiveness, efficiency, and satisfaction. Our definition of a **meeting** is broad--including any activity where people come together, whether at the same place at...

...information systems. The second phase began in 1984 with the construction of a special-purpose **meeting** room to support the same-time/same-place **meetings** of these groups. Thie **meeting** room and the ones that followed are based on a series of **networked** microcomputer **workstations** arranged in a U-shape, around a table, or in tiered legislative style (see Photo 1). A large- **screen** video **display** is provided at the front of the room, from where the **meeting** leader/facilitator guides the **meeting** . Other audio-visual support is also available--typically white boards and overhead projectors [5, 36, 51, 53].

The realization that this technology enabled groups to perform many **tasks** beyond system development (e.g., **strategic** planning), led to the third phase which began in 1986 with the establishments of four...

...these new facilities addresses a different cell in Figure 1; one is a large group **meeting** room, one is a small group **meeting** room, one supports distributed large groups, and the fourth is a **meeting** room-to-**meeting** room **teleconferencing** facility.

During this phase, new **software** was developed (University of Arizona GroupSystems (2)) and was installed at EMS facilities at more...

...doctoral dissertations that have been conducted at Arizona.

While GroupSystems supports a variety of different **tasks** , many groups follow a common sequence of use. The group leader meets with a GroupSystems **meeting** leader/facilitator, who assists in developing an agenda and selecting the GroupSystems tools to be used. **Meetings** typically begin with participants generating **ideas** (e.g., "How can we double our sales over the next four years?" see Figure...

...large screens at the front of the room, as well as being available on each **workstation** . Everyone can see the comments of others, but without knowing who contributed what. Participants can build on each others' **ideas** , independent of any positive or negative bias about who contributed them--**ideas** are evaluated on their own merits, rather than on the basis of who contributed them. These **ideas** are then organized into a list of key issues (e.g., "Stronger ties with customers"), which the group can prioritize into a short list. Next, the group could generate **ideas** for action plans to **accomplish** the important issues, followed by more **idea** organization and **prioritization** , and so on. The result of the **meeting** is typically a large volume of input and **ideas** , and a group **consensus** for further action. In many cases, final **decisions** are not made during the **meeting** , but are made later by the group leader and/or other participants after considering all the information, knowledge and opinions shared. The EMS **meeting** can enable wide participation so that broad input has been obtained, ownership established, and **consensus** developed.

For example, Greyhound Financial Corporation has used GroupSystems on **several** occasions for a variety of **tasks** , including the development of a mission statement, **strategy** formulation, evaluations of senior managers, and information systems (IS) planning. (3) One **meeting** was a one-day session to develop proposals to create competitive advantage, in which 30 managers from all departments used a structured **idea** generation process (a variant on the value chain technique) to develop proposals. On post-session questionnaires, 88% of participants reported that particular **meeting** was more effective than previous non-EMS **meetings** [7]. Said CEO S.L. Eichenfield: "I found that we **accomplished** 100% of our **objectives** . People usually reluctant to express themselves felt free to take part, and we were surprised by the number of new **ideas** expressed. We also reached conclusions far more rapidly."

The experience of this group is typical...human parallel processing);

* provides an equal opportunity for participation;
* discourages behavior that can negatively impact **meeting** productivity;
* enables larger group **meetings** which can effectively bring more information, knowledge, and skills to bear on the **task** ;
* permits the group to choose from a spectrum of structured or unstructured techniques and methods to perform the **task** ;
* offers access to external information; and
* supports the development of an organizational **memory** from **meeting** to **meeting** .

We begin by discussing the theoretical foundations of Group-Systems. These foundations provide the basis for understanding the design and implementation of both our EMS **software** and facilities. We argue that EMS design is one of four contingencies, along with the group, the **task** , and the context, that affect the process of group **meetings** which in turn affects **meeting** outcomes [5]. We will then focus on the key elements in the design of GroupSystems...

...We contend that the effects of EMS use are contingent on a myriad of group, **task** , context and technology factors that differ from situation to situation [5]. Group characteristics that can...

...outcomes include (but are not limited to) group size, group proximity, group composition (peers or **hierarchical**), group cohesiveness, etc. **Task** characteristics include the activities required to **accomplish** the **task** (e.g., **idea** generation, **decision** choice), **task** complexity, etc. Context characteristics include organizational culture, time pressure, evaluative tone (e.g., critical or supportive), reward structure (e.g., none versus individual versus group), etc. **Meeting** outcomes (e.g., efficiency, effectiveness, satisfaction) depend upon the interaction within the **meeting** process of these group, **task** , and context factors with the EMS components the group uses (e.g., anonymity). Thus, it is inappropriate to say that EMS use "improves group **task** performance" or " **reduces** member satisfaction"; all statements must be qualified by the situation--the group, **task** , context and EMS to which they apply. One approach, then, is to conduct developmental research to build an EMS providing certain components that may improve **meeting** outcomes and empirical research to determine what effects these components have in what situations.

To...

...need to examine group processes at a lower level of detail. Certain aspects of the **meeting** process improve outcomes (process gains) while others impair outcomes (process losses) relative to the efforts...

...individuals working by themselves or those of groups that do not experience them [22, 47]. **Meeting** outcomes are contingent upon the balance of these process gains and losses [3]. Situational characteristics (i.e., group, **task** , and context) establish an initial balance, which the group may alter by using an EMS...

...or may not exist at all) depending upon the situation. For example, in a verbal **meeting** , losses due to air time fragmentation, the need to partition speaking time among members, depend...

...more people. If everyone in a 3-member group contributed equally in a 60-minute **meeting** , each person would speak for 20 minutes, while each member of a 15-member group...

...which the EMS can affect this balance of gains of losses: process support, process structure, **task** structure, and, **task** support (Figure 4). Process support refers to the communication infrastructure (media, channels, and devices, electronic...

...communication [12], such as an agenda or process methodology such as Nominal Group Technique (NGT). **Task** support refers to the information and computation infrastructure for **task** -related activities [5], such as external data bases and pop-up calculators. **Task** structure refers to techniques, rules, or modesl for analyzing **task** -related information to gain new insight [12], such as those within **computer** models or **Decision**

Support Systems (DSS).

For example, suppose a group was charged with generating a plan to encourage more European tourists to visit the U.S. Providing each group member with a **computer workstation** that enabled him/her to exchange typed comments with other group members would be process support. Having each member take turns to contribute **ideas** (i.e., round-robin) or agreeing not to criticize the **ideas** of otrhers would be process structure. **Task** support could include information on when, where and how many European tourists visited last year, or about tourist programs run by other governments. **Task** structure could include a framework encouraging the group to consider each U.S. region (e...These four mechanisms are the fundamental means by which an EMS such as GroupSystems affects **meetings** . These mechanisms are not unique to EMS technology. The EMS is simply a convenient means by which to deliver process support, process structue, **task** support, and **task** structure. But in many cases, the EMS can provide a unique combination that is virtually...

...mechanisms, the one that has been central to our research, process support, will be emphasized.

Task structure assists the group to better understand and analyzze **task** information, and is one of the mechanisms by which DSS improve the performance of individual **decision** makers. **Task** structure may improve group performance by **reducing** losses due to incomplete **task** analysis or increasing process gains due to synergy, encouraging more information to be shared, promoting more **objective** evaluation or catching errors (by highlighting information). Methods of providing **task** structure include problem modeling, multicriteria **decision** making, etc. While **task** structure is often numeric in nature, it is not necessarily so. For example, Greyhound used a variant of the value chain technique. Many other non-numeric approaches to providing **task** structue are also available--e.g., stakeholder analysis [32].

Task support may **reduce** process losses due to incomplete use of information and incomplete **task** analysis, and may promote synergy and the use of more information by providing information anc...

...providing additional structure). For example, groups may benefit from electronic access to information from previous **meetings** . While members could make notes of potentially useful information prior to the **meeting** , a more effective approach may be to provide access to the complete sources during the **meeting** itself. Computation support could include calculators or **spreadsheets** .

Task support is also important at an organizational level. Simon argues that technological support for organizational **memory** is an essential part of organizational functioning [45]. An EMS can assist in building this organizational **memory** by recording inputs, outputs and results in one repository for easy access for subsequent **meetings** . Although the importance of such an organizational **memory** has been recognized in system development (e.g., CASE tools), it has not yet been...

...follow the process structuring rules properly [21, 27]. Process structure may be global to the **meeting** , such as developing and following a **strategy** /agenda to perform the **task** , thereby **reducing** process losses due to coordination problems. The EMS can also provide process structure internal to...

...to work separately to reduce production blocking, free riding, and cognitive inertia, while subsequent phases (**idea** sharing and voting) use other techniques to affect other process gains and losses. Process structure...

...support can be provided by the EMS in at least three ways: parallel communication, group **memory** , and anonymity. With parallel communication, each member has a **workstation** that is connected to all other **workstations** , thus providing an electronic channel that enables everyone to communicate simultaneously and in parallel [5...
...Increased interaction may also stimulate individuals and promote learning.

The EMS can provide a group **memory** by recording all electronic comments, which is typically done by many, but not all EMSs...

...blocking and incomplete use of information, and may promote synergy and more information. A group **memory** that enables members to queue and filter information may reduce information overload. A group **memory** is also useful should some members miss all or part of a **meeting** , or if the group is subjected to interruptions that require temporary suspension of the **meeting** [34]. The EMS may also provide other forms of group **memory** that do not capture all comments. An electronic blackboard, for example, may reduce failure to remember by presenting a summary of key information and **reduce** dysfunctional socializing by increasing **task** focus [46].

The electronic channel may provide some degree of anonymity. Anonymity may reduce the...comments, which may promote deindividuation, the loss of self- and group-awareness [54]. This may **reduce** socializing, and encourage more **objective** evaluation and more error catching--due to less negative reaction to criticism, and increased group...

...reduced socializing and more uninhibited comments like "flaming," may reduce group cohesiveness and satisfaction (losses). **Workstations** typically provide a small screen view for members (e.g., 24-line screen), which can...

...overload (gains). But this can also cause members to lose a global view of the **task** [35, 36], increasing losses due to incomplete use of information.

The University of Arizona
GroupSystems...

...legislative sessions [5. 12]--although recent work has studied small project teams and distributed groups **meeting** at the same time in different places. This focus arose from our early work with...

...members were typically assigned to address key issues.

What are the needs of large groups **meeting** at the same place and time? Research with non-EMS-supported groups has shown that...

...42]. particularly if members do not share the same information [21]. Large non-EMS-supported **meetings** are usually less effective and less satisfying than small group **meetings** [42], due to sharp increases in process losses as size increases [2, 47]. We concluded that, in general, high levels of global process structure and process support were appropriate.

Task structure and **task** support also depend on **task** characteristics. Since the groups with whom we worked often faced **strategic** issues, we developed **several** tools providing **task** structure and support for **strategic** planning (e.g., stakeholder analysis), as well as general-purpose tools capable of supporting a variety of **task** structure and support needs. As **strategic** **tasks** are often associated with political and highly competitive groups [32], process support components such as...

...important.

GroupSystems Architecture

The general design for GroupSystems builds on three basic concepts: an EMS **meeting** room, **meeting** facilitation, and a **software** toolkit. Although many different **meeting** room designs have been used, the minimum configuration provides a separate **networked** , hard disk-based, color graphics microcomputer **workstation** to each participant, with another one or two **workstations** serving as the **meeting** leader/facilitator's console. A large- **screen** video **display** is provided as an electronic blackboard, with other audio-visual support also available (e.g., white boards and overhead projectors) [5, 336, 51, 53].

. **Meeting** leader/facilitator: The person who chairs the **meeting** is the leader/facilitator. This person may be the group leader, another group member or...

...A nonmember can be a specialist in EMS and group work, but may lack the **task** and group knowledge of a regular member. The **meeting** leader/facilitator provides four functions. First, this person provides technical support by initiating and terminating specific **software** tools, and guiding the group through the technical aspects necessary to work on the **task** . This **reduces** the amount of training required of group members by removing

Chauffeured	Supported	Interactive
* One person...		
...comments		
* Electronic black-board can provide group **memory**	* Electronic black-board can provide group **memory**	* All comments in group **memory** accessible via **workstations**
* Verbal communication predominates	* Both verbal and electronic communication	* Electronic predominates

one level of system complexity. In some cases, technical support is provided by an additional technical facilitator.

Second, the **meeting** leader/facilitator chairs the **meeting** , maintains the agenda and assessees the need for agenda changes. The **meeting** leader/facilitator may or may not take an active role in the **meeting** to improve group interaction by, for example, providing process structure in coordinating verbal discussion. This person also administers the group's knowledge. In EMSs designed without support for **meeting** leader/facilitators, any member may change or delete the group **memory** . When disagreements occur, members' competition for control can become dysfunctional (e.g., "Scroll Wars" [46...

...where competitive political motives and vested interests exist. With GroupSystems, members can view the group **memory** and add to it at their own **workstation** , but in general only the **meeting** leader/facilitator can modify and delete public information.

Third, the **meeting** leader/facilitator assists in agenda planning, by working with the group and/or group leader to highlight the principal **meeting** **objectives** and develop an agenda to **accomplish** them. Specific GroupSystems tools are then mapped to each activity. Finally, in on-going organizational settings where **meeting** leader/facilitators are not group members, they provide organizational continuity by setting standards for use...

...as champion/sponsors, which is key to successful technology transfer [31]. The roles of the **meeting** leader/facilitator may also change over time. For example, after a group has some experience using EMS, the need for technical support and agenda planning advice may decrease.

Software toolkit: Many first-generation EMSs were **task** -driven, as

defined by Huber [25], in that they were designed to support one single group **task** . Second-generation EMSs, such as GroupSystems, provide a **software** toolkit, similar to a DSS model base, which is a collection of generic tools for various group activities such as **idea** generation and voting rather than being one indivisible system to support the entire **task** like **strategic** planning. Such EMSs are activity driven.

The key advantage provided by a toolkit is flexibility...

...activity, thus the EMS can provide various combinations and styles of process structure, process support, **task** structure and **task** support during any one **meeting** . Groups use many approaches and often do not proceed in a straightforward manner [40]. The...

...use the EMS as intended by its designers; this has proved a problem with non- **computerized** techniques [21, 27]. Restrictiveness promotes the use of more effective techniques and prevents less effective...
...perform only certain functions. The selection of which tools will be used for a specific **meeting** is done during a pre- **meeting** planning **meeting** . During the **meeting** itself, the system is **restrictive** , so that members use only those tools determined to be the most appropriate during pre...

...who makes changes, not individual members.

Development of GroupSystems tools has not followed either the **Software** Development Life Cycle model or the rapid prototyping model, although we do believe in prototyping...

...tool typically comes from prior group theory and research (e.g., NGT), from a specific **task** domain (e.g., stakeholder analysis [32]) or from our own experiences. The concept is first...

...provides tools in five areas:

1. session planning and management;
2. group interaction;
3. organizational **memory** ;
4. individual work; and
5. research data collection.

Tools in the first three areas are...
...development. An expert system to assist this stage is currently under development. SM provides in- **meeting** management via the control menu; all tools are initialized, started, and ended via SM. SM also provides a **task** assignment tool to record information about the **tasks** assigned to specific individuals. Members are provided read-only access to this list but only...

...add to or modify its contents. Post-session organization involves the logical organization and physical **storage** of the session outputs as part of the organizational **memory** . Various components can be indexed and **stored** , **task** assignment reports generated and distributed, and paper printouts copied and distributed to better integrate information...

...for Group Interaction

The purpose of these tools is to provide process structure, process support, **task** structure and **task** support for group interaction. While there are many possible combinations of the process support functions (i.e., parallel communication, group **memory** , anonymity), GroupSystems provides three distinct styles of process support which blend these functions with different...

...with each other and with non-EMS verbal discussion at different stages

of any one **meeting** . We first describe these three styles (see Figure 6) and then consider the process gains the EMS, either a group member or the **meeting** leader/facilitator. A **workstation** is connected to a public **display screen** , providing an electronic version of the traditional blackboard. The group verbally discusses the issues, with the electronic blackboard used as a group **memory** to record and structure information. A supported style is similar to a chauffeured style, but differs in that each member has a **computer workstation** that provides a parallel, anonymous electronic communication channel with a group **memory** . The **meeting** proceeds using a mixture of verbal and electronic interaction. The electronic blackboard is still used...

...add items. With an interactive style, the parallel, anonymous electronic communication channel with a group **memory** is used for almost all group communication. Virtually no one speaks. While an electronic blackboard may be provided, the group **memory** is typically too large to fit on a screen, and thus it is maintained so that all members can access it electronically at their **workstations** .

The interactive style is the strongest intervention (but not necessarily "the best") as it provides parallel communication, group **memory** and anonymity to reduce process losses due to air time fragmentation, attenuation blocking, concentration blocking...
...communication channel, but rather addresses failure to remember by providing focus through a common group **memory** displayed on the electronic blackboard. An increased **task** focus promoted by this style may also reduce socializing. Few other process gains or losses...

...possibly failure to remember and information overload) will be increased beyond that of a traditional **meeting** (or an interactive style) as members must simultaneously monitor and use both verbal and electronic...

...switch to verbal interaction).

Each GroupSystems tool was initially designed to use one of these **meeting** styles to support one specific type of group activity. There are many useful ways of classifying group acitivities [42]. We use four categories. The first, exploration and **idea** generation, involves the development and exploration of issues relevant to the **task** . The second category, **idea** organization, involves the synthesizing, structuring, and organizing of **ideas** into specific alternatives which may follow the generation of **ideas** ; if a group has previously discussed an issue, a **meeting** may begin with **idea** organization without **idea** generation. Tools in the third category, prioritizing, support the individual members in evaluating alternatives. The...
...be used in whatever order the group chooses; there is no mandatory order, although many **tasks** follow a natural order of **idea** generation, **idea** synthesis, **prioritizing** , and exploration of important issues.

Table 2 summarizes the activities and process support, process structure, **task** support, and **task** structure of each group interaction tool. The levels of process support (law, medium, high) correspond to the three **meeting** styles (chauffeured, supported, interactive) respectively. While most tools can be used in chauffeured mode or in different ways according to the direction of the **meeting** leader/facilitator, they are described as they are normally used at Arizona. All tools provide at least a medium level of **task** support due to BriefCase, a **memory** resident organizationl **memory** tool. For more information, see [7,51].

Exploration and **idea** generation: The **objective** of these tools is to assist the group in exploring issues and generating **ideas** and alternatives. Electronic **Brainstorming** (EBS) provides an interactive style in which participants enter comments into many separate discussions contained...

...the group from focusing on one approach. Process support and structure are thus high, while **task** structure is low. Electronic Discussion System (EDS) was developed for laboratory research to support exploration and **idea** generation, **idea** organization and voting. Its support for exploration and **idea** generation works in a manner similar to EBS, except that it can also be configured...

...Commenter (TC), which uses an interactive style (high process support), provides a high level of **task** -specific framework. TC operates like a set of index cards, with each card having a...

...be hierarchically structured) using a supported style and then discuss them with an interactive style.

Idea organization: The purpose of **idea** organization is to identify, synthesize, formulate and consolidate **ideas** , proposals or alternatives--that is, to build a **task** structure for **ideas** . **Idea** Organizer (IO) provides a supported style, while Issue Analyzer (IA) provides a more structured two-phase approach that first identifies (via an interactive style) and then consolidates (i.e., achieves **consensus** on) **ideas** (via a chauffeured style). With both tools, each participant works separately to create a private list of **ideas** which are submitted to the group. Comments from a previous **idea** generation activity may be available as **task** support and may be easily included. As the list grows, the **meeting** leader/facilitator assists the group in combining similar **ideas** to move to **consensus** . Group Writer is a multiuser **word processor** that enables a group to jointly write and organize documents. Most group interaction is electronic...

...followed by a chauffeured style to discuss the results. Alternative Evaluator (AE) is a multicriteria **decisionmaking** tool that uses a similar interactive/chauffeured set of styles. With AE, the group rates...

...completes an electronic questionnaire, which may branch to different questions based on user responses. Group **Matrix** is a consensu-building tool that enables participants to dynamically enter and change numeric (or text) ratings in a two-dimensional **matrix** . Typically groups initially enter ratings with an alternative style. These ratings are then discussed and...

...to support policy development and evaluation. Stakeholder Identification and Assumption Surfacing (SIAS), based on the **strategic** assumption surfacing and testing techniques developed by Mason Mitroff [32], is used to assess the...

...the policy is sent out to be redrafted again by each participant.

TOOLS FOR ORGANIZATIONAL **MEMORY**

The primary purpose of the organizational **memory** tools is to provide **task** structure and **task** support. Thus far, many EMSs have supported **meetings** as independent, autonomous events. Group-Systems views the **meeting** as one part of a larger whole. While improving **meeting** outcomes is important, it is also important to capture the additions to organizational **memory** and to provide access to them in subsequent **meeting** (s). The organizational **memory** tools provide this organizational **memory** . Some of the files it contains are knowledge bases in the artificial intelligence sense (e...

...semantic nets) while others are text files or databases.

Briefcase (BC), mentioned earlier, is a **memory** resident tool that provides immediate read-only access to any text file in the organizational

memory at any point during the session. The user simply presses the appropriate keys and is...

...with the Semantic Graphics Browser (SGB). SGB enables the user to move through the organizational **memory** and "zoomin" on specific areas to view details, "zoom-out" to obtain a high-level...

...to display detail information under a node. Group Dictionary enables the group to develop and **store** formal definitions for use in current or subsequent **meetings** .

EMS in Practice:
Lessons From Using
GroupSystems

Our research **strategy** has been to build on theoretical foundations from prior research to develop EMS environments which...

...in understanding the impacts of EMS, and in developing the EMS components appropriate for various **tasks** , groups and organizations. While most studies have found EMS use to improve effectiveness, efficiency and...

...conclusion is therefore that even within the same EMS, effects depend on the group, the **task** , the context, and the EMS components used. This should not be surprising; Figure 4 suggests that the effects depend on interactions among more than three dozen constructs in the **meeting** process.

We believe it will be difficult to find universal truths. In the meantime, we...

...contingency theories to identify the best fit between specific EMS components and the specific group, **task** , and context characteristics. Isolating the individual effects of specific situational characteristics and EMS components is...
...that processes and outcomes depend upon the interaction of four sets of characteristics: context, group, **task** and EMS. There are dozen of potentially important contingencies. We consider only five: one from...

...from group characteristics (size and proximity), one from the context (evaluative tone) and one from **task** (**task** activities). For each, we present theoretical arguments and empirical evidence that ...individuation associated with the reduction of social cues has been found in some forms of **computer** -mediated communication, the most extreme form of which is "flaming" [cf. 43].

Changes in evaluation...

...pressure and social cues brought about through anonymous communication should have some effect on the **meeting** process, which should in turn affect the **meeting** 's outcomes. The relaxation of social cues in anonymous EMS groups has been found in...

...apprehension and conformance pressure are high, anonymity appears to have a more signficant impact on **meeting** outcomes.

In all of the laboratory studies referenced here, anonymity was treated as a discrete...
...group size [47]. Previous non-EMS researcgh has concluded that in general, regardless of the **task** , context or group, the "optimal" group size is quite small, typically 3--5 members [42...

...EMS research draws a different conclusion: the optimal group size depends upon the situation (group, **task** , context, EMS), and in some cases may be quite large.

In theory, each of the...

...degrees. A chauffeured style reduces a few process losses. Thus compared to traditional non-EMS **meetings** , process losses do not increase quite as fast with group size (see Figure 7). A...

...20 group members) have reported that interactive styles were more important than supported styles [37].

Task Activities

The type of acitivites that must be performed to **accomplish** the **task** (e.g., **idea** generation) [42] has a significant impact on the balance of gains and losses. One primary **goal** of most group activities is the exchange of information among members [12], and thus the...for the information or the framework.

Equivocality requires negotiation among group members to converge to **consensus** on one interpretation, and media providing information richness are preferred [4]. In contrast, ambiguity and...

...paramount, especially if members of the group have different information, perceptions, and viewpoints.

Exploration and **idea** generation is more often a problem of ambiguity or uncertainty than of equivocality. It is...

...Prioritizing is also a divergent activity, as members work individually. In contrast, synthesizing and organizing **ideas** , building **consensus** on a framework, or interpreting the meaning of vote to achieve **consensus** are primarily problems of equivocality, as the group focuses on the same issues at the same time to **resolve** different viewpoints to converge on one interpretation.

Therefore, for divergent activities that are problems of uncertainty, such as **idea** generation, we hypothesize that an interactive style is more appropriate as its parallelism and anonymity facilitate rapid development of **ideas** . For convergent **tasks** that are problems of equivocality (such as synthesis and **consensus** building), process losses from **reduced** media richness in the interactive style increase dramatically. In this case, the relatively horizontal line...

...Our laboratory and field research provide weak support for this hypothesis. A laboratory experiment of **idea** generation--a **task** of uncertainty--found groups using an interactive style to generate more **ideas** and be more satisfied than verbally interacting groups [18]. A similar study using Group-Systems...

...Indiana University had similar findings [16]. Experiments using purely interactive style for generating and choosing **tasks** (**tasks** which begin with ambiguity but evolve into equivocality) have found no performance or satisfaction differences...

...19, 55]. The EMS groups in one of these studies also required longer to reach **consensus** [19]. Groups in our field studies have typically used interactive styles to generate **ideas** , options, and analysis framework components, but used supported or chauffeured style to **resolve** equivocality.

Group Member Proximity

In our definition of an EMS [5], we note that groups...

...in a single room at the same time. Other researchers have also argued that advanced **computer** -assisted communication and **decision** technologies, such as an EMS, can be important for project-oriented work groups and temporary **task**0 forces that may be distributed geographically and temporally throughout an organization [e.g., 26].

From...

...has shown that the presence of others can improve a person's performance for each **tasks** and hinder performance for more difficult **tasks** [57]. Remoteness may also foster increased anonymity, and increased anonymity may have several effects on...

...groups [29].

Our initial research in this area has built on our growing body of **idea** generation research (i.e., a problem of uncertainty not equivocality), where groups communicate only through electronic communication. One laboratory experiment found no difference in the number of **ideas** generated between proximate and distributed groups, but found proximate groups to be more satisfied [29]. A second study using a similar research design found distributed groups to generate more **ideas** than proximate groups, with no satisfaction differences [48].

During these experiments, proximate groups were interrupted...

...primary explanation for these performance effects in the laboratory was that distributed groups remained more **task** -focused than proximate groups.

However, the effects of the proximity manipulation may have been different...

...be helped (e.g., a call from the boss) or by purposely working on other **tasks** . As a result, distributed groups in the field may, or may not, be more **task** focused than groups working together in the same room, and thus may find different effects...

...evaluation apprehensuion and encpouraging "freewheeling" stimulation. The withholding of criticism is a cornerstone of many **idea** generation techniques [38]. However, other researchers have proposed that group productivity may be stimulated by...

...Valacich [3] used a laboratory experiment which crossed anonymity (anonymous or identified groups) with the **meeting** tone (supportive or critical as manipulated by a confederate) to test whether the effects of ...or supportive. Groups working anonymously and with a critical tone produced the greatest number of **ideas** of the highest quality. However, groups in supportive and identified conditions were typically more satisfied...

...anonymous conditions. This suggests that the combination of a critical tone and anonymity may improve **idea** generation, but also may lower satisfaction.

Observations from our field studies provide some insight into...

...for these effects. The anonymity may have encouraged group members to deteach themselves from their **ideas** , allowing them to view criticism as a signal to suggest another **idea** :

"I noticed that if someone criticized an **idea** of mine, I didn't get emotional about it. I guess when you are face...

...the boss say 'You are wrong' it's a slap to you, not necessarily the **idea** . . . . . [Here] no one knows whose **idea** it is, so why be insulted? No one is picking on me. I think I...

...runs counter to the typical knee-jerk reaction that might occur in a traditional vebal **meeting** where a critical comment may be seen as directed at the contributor, not the **idea** (e.g., "I wasn't as uncomfortable when I saw someone being critical of someone else's **idea** ,

because I thought 'nobody's being embarrassed here at all.'" manager, Hughes Aircraft).

Conclusion

The...

...included both developmental and empirical research. Our developmental research has produced more than two dozen **software** tools currently in use at more than 70 EMS facilities worldwide. Our empiricial research has...

...foundation of EMS, have illustrated how these aspects are reflected in the Arizona facility and **software** designs, and have highlighted the contingent nature of EMS effects. Nonetheless, much more research is needed to develop new group work methods embodied in facilities and **software** , and to empirically test the many contingencies involved in their use.

While still recognizing the...

...believe that EMS use may provide benefits because:

* Parallel communication promotes broader input into the **meeting** broader input into the **meeting** process and **reduces** the chance that a few people dominate the **meeting** ;

* Anonymity mitigates evaluation apprehension and conformance pressure, so that issues are discussed more candidly;

* Group **memory** enables members to payuse and reflect on information and opinions of others during the **meeting** and serves as a permanent record of what occurred;

* Process structure helps focus the group on key issues and discourages irrelevant digressions and unproductive behaviors; and

* **Task** support and structure provides information and approaches to analyze it.

We have drawn four general...

...Thus we believe that it is critical to clearly document specifics about the group, task, **context** , and EMS in all research. Who were the group members and were they a cohesive team, strangers, or competitors? Exactly what did the task **entail** ? Were group members members motiviated? What did the EMS provide at what points, and exactly...

...they apply to large or small groups, chauffeured, supported or interactive styles, choice or idea **generation** activities, etc.? We agree with Huber·[26] that even apparently subtle differences may have significant...

...groups using EBS with a few seconds slower response time to generate significantly fewer ideas **than** those using the standard version [17]. Only by carefully defining the scope of a study...

...research into new technologies. From this research, we know that EMS and non-EMS meeting **are** different, but cannot completely explain why. While there is still a place for such research...

...conclusions. Field research presenting qualitative investigations of EMS effects on group process in different meeting **situations** and over the long term will also become important. Our future empirical research will continue ...and explain why certain EMS features (i.e., types of process support, process structure, task **support** and task **structure**) are of value for certain groups, tasks **and** contexts.

Finally, we believe that in developing new EMS tools, it is important to strive...

...horseless carriage. We are now in the horseless carriage phase of EMS, having installed computers **into** existing manual processes. We need to learn how best to support groups and group meeting **processes** , to build on

these experiences to create systems that take better advantage of the abilities...

...MIS at the University of Arizona where he is a professor of MIS and Computer **Science** . His research interests include computer- **aided** support of systems analysis and design, and systems for management.

ALAN R. DENNIS is a...

...candidate in MIS at the University of Arizona. His current research interests include electronic meeting **systems** , system analysis and design, and business process re-engineering.

JOSEPH S. VALACICH is assistant professor...

...of Indiana. His current research interests include the design and investigation of communication and decision **technologies** to support collaborative group work, systems analysis and design, and group and organizational memory.

DOUGLAS R. VOGEL is an assistant professor of MIS at the University of Arizona. His research...

...on information technology in the work place, and currently include the study of group decision **support** systems.

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CAPTIONS: Important sources of group process gains and losses. (table);
Potential EMS (Electronic **Meeting** Systems) effects. (chart)

DESCRIPTORS: **Computer conferencing** --...
... **Conferences , meetings** , seminars, etc.
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Groupware: some issues and experiences. (using computers to facilitate human interaction)
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Groupware: some issues and experiences. (using computers to facilitate human interaction)

...ABSTRACT: discussion of the 'groupware' concept and issues involved in its implementation is presented. Work-group **software** applications are sometimes defined as those intended for small, narrowly-focused groups and sometimes as enterprise-wide **strategic** programs. A broader view sees groupware as the class of applications that emerges from the **networking** of **computers** and large databases. Communication, collaboration and coordination are the key **goals** of groupware. It can be designed to assist a face-to-face group or one...

Society requires much of its character from the ways in which people interact. Although the **computer** in the home or office is now commonplace, our interaction with one another is more or less the same now as it was a decade ago. As the technoligies of **computers** and other forms of electronic communication continue to converge, however, people will continue to interact...

...and communication activities. The study of such systems is part of a new multidisciplinary field: **Computer** -Supported Cooperative Work (CSCW) [29]. Drawing on the expertise and collaboration of many specialists, including social scientists and **computer** scientists, CSCW looks at how groups work and seeks to discover how technology (especially **computers**) can help them work.

Commercial CSCW products, such as The Coordinator[TM] [24] and other PC-based **software** [67], are often referred to as examples of groupware. This term is frequently used almost...

...or [44] for general descriptions of, and strong motivation for groupware). Others define groupware as **software** for small or narrowly focused groups, not organization-wide support [30]. We propose a somewhat
...
...the class of applications, for small groups and for organizations, arising from the merging of **computers** and large information bases and communications technology. These applications may or may not specifically support...

...five main sections. First, the Overview defines groupware in terms of a group's common **task** and its need for a shared environment. Since our definition of groupware covers a range...

...that there is much interesting work remaining to be done in this field.

Overview

Most **software** only support the interactin between a user and the system. Whether preparing a document, querying a database, or even playing a video game, the user interacts solely with the **computer** . Even systems designed for multiuser applications, such as office information systems,

provide minimal support for...

...to three key areas: communication, collaboration, and coordination.

The Importance of
Communication, Collaboration,
and Coordination

Computer -based or **computer** -mediated communication, such as electronic mail, is not fully integrated with other forms of communication ...

...phone numbers, for example, and it it uncommon to originate a telephone conversation from a **workstation** . Integrating telecommunications and **computer** processing technologies will help bridge these gaps.

Similar to communication, collaboration is a cornerstone of...

...check the object in and out and tell each other what they have done. Many **tasks** require an even finer granularity of sharing. What is needed are shared environments that unobtrusively...

...actions. Coordination can be viewed as an activity in itself, as a necessry overhead when **several** parties are performing a **task** [62]. While current database applications contribute somewhat to the coordination of group's--by providing multiple access to shared objects--most **software** tools offer only a single-user perspective and thus do little to assist this important function.

A Definition of Groupware

The **goal** of groupware is to assist groups in communicating, in collaborating, and in coordinating their activities. Specifically, we define groupware as:

computer -based systems that support groups of people engaged in a common **task** (or **goal**) and that provide an interface to a shared environment.

The notions of a common taks...

...excludes multiuser systems, such as time-sharing systems, whose users may not share a common **task** . Note also that the definition does not specify that the users be active simultaneously. Groupware...

...issues.

The term groupware was first defined by Johnson-Lenz [46] to refer to a **computer** -based system plus the social processes. In his book on groupware [44], Johansen restricts his definition to the **computer** -based system. Our definition follows the ...that the system and the group are intimately interacting entities. Successful technological augmentation of a **task** or process depends upon a delicate balance between good social processes and procedures with appropriately...

...between systems that are considered groupware and those that are not. Since systems support common **tasks** and shared environments to varying degrees, it is appropriate to think of a groupware spectrum...
...Figure 1. Following are two examples of systems described according to our definition's common **task** dimension:

1. A conventional timesharing system supports many users concurrently performing their separate and independent **tasks** . Since they are not working in a tightly coupled mode on a common **task** , ths system is usually low on the groupware spectrum.

2. In contrast, consider a **software** review system that electronically allows a group of designers to evaluate a **software** module during a real-time interaction. This system assists people who are focusing on the same specific **task** at the same time, and who are closely

interacting. It is high on the groupware...

...system allows an instructor to present an on-line lecture to students at remote personal **workstations** . In addition to the blackboard controlled by the teacher, windows display the attendance list, students...

...system, contained advanced feature such as filters for selectively viewing information, and support for online **conferencing** . Today's improved technology and enhanced user interfaces have boosted this type of system higher...

...These time and space considerations suggest the four categories of groupware represented by the 2x2 **matrix** shown in Figure 2. **Meeting** room technology would be within the upper left cell; a real-time document editor within...

...same base functionality, and user interface look and feel (a) while I am using a **computer** to edit a document in real-time with a group (same time/same place or...

...are other dimensions, such as group size, that can be added to this simple 2x2 **matrix** . Further details of this taxonomy are presented by Johansen [45].

Application-Level
Taxonomy
The second...

...many of the defined categories overlap. This taxonomy is intended primarily to give a general **idea** of the breadth of the groupware domain.

Message Systems

The most familiar example of groupware is the **computer** -based message system, which support the asynchronous exchange of textual messages between groups of users. Examples include electronic mail and **computer conferencing** or bulletin board systems. The proliferation of such systems has led to the "information overload...by otehrs. The DisEdit system [49] tries to provide a toolkit for building and supporting **multiple** group **editors** .

Group **Decision** Support
Systems and Electronic
Meeting Rooms

Group **Decision** Support Systems (GDSSs) provide **computer** -based facilities for the exploration of unstructured problems in a group setting (see [51] or [16] for recent surveys). The **goal** is to improve the productivity of **decision** -making **meetings** , either by speeding up the **decision** -making process or by improving the quality of the resulting **decision** [51]. There are GDSS aids for **decision** structuring, such as alternative **ranking** and voting tools, and for **idea** generation [2] or issue analysis [11].

Many GDSSs are implemented as electronic **meeting** roδms that contain several **networked** **workstations** , large **computer** -controlled public displays, and audio/video equipment (examples ar discussed in [2, 12, 16, 64...

...operational competence among the group members.

A well-known example is the PlexCenter Planning and **Decision** Support Laboratory at the University of Arizona [2]. The facility provides a large U-shaped **conference** table with eight personal **workstations** ; a **workstation** in each of four break-out roomsf a video disk; and a large-screen projection system that can **display** **screens** of individual **workstations** or a compilation of screens. The **conference** table

workstations are recessed to enhance the participants' line of sight and to encourage interaction. They communicate over a local area **network** and run **software** tools for electronic **brainstorming** , stakeholder identification and analysis, and issue analysis.

Recent work at the University of Arizona has concentrated on the support of larger groups. The current large group facility has 24 **workstations** designed to support up to 48 people. The support of large groups presents unique challenges and opportunities.

Computer Conferencing

The **computer** serves as a communications medium in a variety of ways. In particular, it has provided three new approaches in the way people carry out **conferences** : real-time **computer conferencing** , **computer teleconferencing** , and **desktop conferencing** .

Real-Time **Computer Conferencing**

Real-time **computer conferencing** allows a group of users, who are either gathered in an electronic **meeting** room or physically dispersed, to interact synchronously through their **workstations** or **terminals** . When a group is physically dispersed, an audio link, such as a **conference** call, is often established.

There are two basic approaches to implementing real-time **computer conferencing software** [73]. The first embeds an unmodified single-user application in a **conferencing** environment that multiplexes the application's output to each participant's display [42]. Input comes...

...passing protocol (determining who has the floor) exchanges input control among users [56]. Examples includes **terminal** linking (a service found in some time-sharing systems) and replicated windows (typically implemented by a window **server** that drives a set of displays in tandem). The second approach is to design the...

...for the presence of multiple users. Some examples are Real Time Calendar [RTCAL] [73], a **meeting** scheduling system, and Cognoter [78], a real-time group note-taking system.

Each approach has...

...but the application must be built from the ground up or with considerable additional effort.

Computer Teleconferencing

Telecommunication support for group interaction is referred to as **teleconferencing** [43]. The most familiar examples of **teleconferencing** are **conference** calls and video **conferencing** . **Teleconferencing** tends to be awkward, requiring special rooms and sometimes trained operators. Newer systems provide **workstation** -based interfaces to a **conference** and make the process more accessible. Xerox, for example, established an audio/video link for...

...areas at each side, but project members could also access video channels through their office **workstations** . A similar system, CRUISER [72], lets users electronically roam the hallways by browsing video channels.

Desktop Conferencing

Teleconferencing is not only relatively inaccessible, but it also has the disadvantage of not letting participants share text and graphics (see [18] for a discussion of the failure of video **conferencing**). Real-time **computer conferencing** does not offer video capabilities. A third type of **computer** -supported **conferencing** combines the advantages of **teleconferencing** and real-time **conferencing** while mitigating their drawbacks. Dubbed **desktop conferencing** , this method still uses the **workstation** as the **conference** interface, but it also runs applications shared by the participants. Modern **desktop conferencing** systems support

multiple video windows per **workstation** . This allows display of dynamic views of information, and dynamic video images of participants [80].

An example of **desktop conferencing** is the MMConf system [14]. MMConf provides a shared display of a multimedia documents, as well as communications channels for voice and shared pointers. Another example is the Rapport multimedia **conferencing** system [1]. Rapport is designed for **workstations** connected by a multimedia **network** (a **network** capable of transmitting data, voice, and video). The system supports various forms of interaction, from...

...conversations to multiparty shared-display interaction.

Intelligent Agents

Not all the participants in an electronic **meeting** are people. Multiplayer **computer** games, for example, might automatically generate participants if the number of people is too low...concept is "surrogates" [44]). In general, intelligent agents are responsible for a specific set of **tasks** , and the user interface makes their actions resemble those of other users.

As a specific...

...The coordination problem is the "integration and harmonious adjustment of individual work efforts toward the **accomplishment** of a larger **goal** " [76]. Coordination systems address this problem in a variety of ways. Typically these systems allow...
...actions, as well as the relevant actions of others, within the context of the overall **goal** . Systems may also trigger users' actions by informing users of the states of their actions...

...Folders [ECF] [48] exception handling is addressed through migration specifications that describe all the possible **task** migration routes in terms of the steps to be carried out in processing organizational documents ...

...process programming" [3, 68, 69]. This approach was first applied to coordination problems in the **software** process domain and takes the view that **software** process descriptions should be thought of and implemented as **software** . The development of process programs is itself a rigorous process consisting of specification, design, implementation...

...more merging of these functionalities. Intelligent message systems can and have been used for coordination. **Desktop conferencing** systems can and have been used for group editing. Nevertheless, many systems can be categorized...

...are at least five key disciplines or perspectives for successful groupware: distributed systems, communications, human- **computer** interaction, artificial intelligence (AI), and social theory. It is important to note that the relationship...

...usually combines the perspectives of two or more of these disciplines. We can see the **desktop conferencing** paradigm, for example, as having been derived in either of two ways:

1. by starting with communications technology and enhancing this with further computing power and **display devices** at the phone receiver, or
2. by starting with the personal **workstation** (distributed systems perspective) and integrating communications capabilities.

Distributed Systems

Perspective

Because their users are often...

...issues related to robustness: recipients should be able to receive messages even when the mail **server** is unavailable. One **solution** is to replicate message **storage** on multiple **server** machines [16]. Discovering and implementing the required algorithms--algorithms that will keep these **servers** consistent and maintain a distributed name lookup facility--is a challenging **task** .

Communications Perspective

This perspective emphasizes the exchange of information between remote agents. Primary concerns include...minimized. For example, distributed interactions allow participants to access other relevant information, either via the **computer** or in a book on the shelf, without interrupting the interaction flow. This is analogous...

...to the classes of interactions that will benefit the most from the new medium.

Human- **Computer**

Interaction Perspective

This perspective emphasizes the importance of the user interface in **computer** systems. Human- **computer** interaction is itself a multidisciplinary field, relying on the diverse skills of graphics and industrial designers, **computer** graphics experts (who study **display** technologies, input **devices** , and interaction techniques), and cognitive scientists (who study human cognitive, perceptual, and motor skills).

Until...

...user systems. Groupware challenges researchers to broaden this perspective, to address the issues of human- **computer** interaction within the context of multiuser or group interfaces. Since these interfaces are sensitive to...

...use by different groups must be flexible and accommodate a variety of team behaviors and **tasks** : research suggests that two different teams performing the same **task** use group technology in very different ways [17]. Similarly, the same team performing two separate **tasks** uses the technology differently for each **task** .

AI may, in the long run, provide one of the most significant contributions to groupware...

...on which the systems are based.

Real-Time Groupware

Concepts and Example

The vocabulary and **ideas** embodied in groupware are still evolving. In this section, we list some important terms useful...

...session is a period of synchronous interaction supported by a groupware system. Examples include formal **meetings** and informal ...during a work session.

Within a GROVE, session, each user has his or her own **workstation** and bitmap display. Thus each user can see and manipulate one or more views of...

...and disappear in all appropriate group windows. The window in Figure 3 appears on the **workstations** of the three users shown along the bottom border, and each user knows that the...

...session, they receive an up-to-date document unless they choose to retrieve a previously **stored** version. The current context, is maintained even though changes may have occurred during their absence...

...and notification.

The architecture uses a local editor and replicated document at each

user's **workstation** , and a centralized coordiantor that serializes theoperations of the various editors. This forced us to...

...editor is at the opposite extreme from most CASE systems which force a group of **software** engineers to lock modules and work in a very isolated and serial manner. The answer...several groups for a variety of design activities, from planning joint papers and presentations to **brainstorming** . In general, sessions can be divided into three types:

1. face-to-face sessions in the electronic **meeting** room at our lab where there are three Sun **workstations** and an electronic blackboard,
2. distributed sessions where the participants work from machines in their offices and use a **conference** call on speaker phones for voice communication, and
3. mixed-mode sessions where some of...

...to-face and others are distributed.

Table 1 lists the session type, group size, and **task** for fifteen GROVE sessions. The early sessions were mostly face-to-face sessions where we...

...within the group. People often divide into subgroups to work on different parts of the **task** by using a social protocol and shared views. Then their work is merged with the...

...concentration. People have commented that in general, face-to-face sessions feel shorter, seem to **accomplish** more in less time, and are frequently more exhilarating. In contrast, distributed and mixed-mode...

...Since there is less interchange about nontask-related topics, people tend to focus on the **task** immediately. The effect is a possible efficiency gain from time saved and a possible loss...

...others' activities is frequently at a subconscious level. As one user expressed it, "During the **brainstorming** phase, I remember feeling that I was totally occupied with entering my own thoughts as...cutting and pasting certain agreed-upon lines to new locations in the outline. The group **accomplished** the subtree move in less time than if one person had done it alone.

Can...

...comments on, appends to, or modifies what has already been entered (perhaps by other users),

* **consensus** entry--as the result of discussion the group decides on an appropriate entry or modification...

...for a joint talk. This system was basically a single-user tool, despite its shared **desktop** feature. People could not edit slides on the spot and effect a shared view of...

...Although this system had powerful graphics and formatting capabilities, it was not adequate for the **task** at hand and users missed GROVE's collaborative editing features.

Design Issues

Groupware systems of...

...bear directly on a system's success. Researchers are currently exploring methods and techniques for **resolving** these issues, but many key research problems remain to be solved. This section focuses on...

...the GROVE group window illustrated in Figure 3. Other examples include

interfaces to real-time **computer conferencing** systems and to multiplayer games.

Group interfaces introduce design problems not presented by single-user...is needed are ways to provide contextual clues to the group's activity. A simple **solution** is for participants to audibly announce their intentions prior to taking action--suitable in some...

...however, introduces a new set of problems. First, animation is computationally expensive and requires specialized **workstation** hardware. Second, it is difficult to find visual metaphors that are suitable for animating operations, although work on artificial realities and responsive environments [54, 55] seems promising. Finally, any **solution** to this problem must take into account the dual needs for speed and continuity: the ...

...of usage patterns as we observed with GROVE. The text was generated as independent, reflective, **consensus** , partitioned, and recorded entries and, therefore required much richer interfaces.

An experimental cloudburst model of...
...to aggregate windows into functional sets, or rooms, each of which corresponds to a particular **task** [9, 61]. Participants can move from room to room or be teleported by other users...

...they must introduce new constructs that better accommodate shared usage.

Group Processes

Some well-defined **tasks** , such as code walk-throughs, require the participation of a set of users and are...

...mutually agreed upon ways of interacting. These protocols may be built into the hardware and **software** , called technological protocols, or left to the control of the participants, called social protocols. Examples of technological protocols are the floor control mechanisms in several **conferencing** systems [1, 27, 56]. These systems can only process one user's input requests at...protocols), however, can be unfair, distracting, or inefficient. In contrast, embedding a group process in **software** as a technological protocol ensures that the process is followed, provides more structure to the...

...single operation. We call the resultant operations group operations. There are many cases of groups **accomplishing** a **task** with more speed and accuracy than would be possible by a single individual. Examples include...
...out by a group are easier to understand if they are not divided into specific **tasks** performed by specific individuals.

Group operations occur in both synchronous and asynchronous situations. Office procedures...

...organizational knowledge, exceptions, coordination and unstructured activity. Knowledge of an organization's structure, history and **goals** , is useful when following office procedures [5], yet this knowledge is volatile and difficult to...

...all the situations encountered by an office procedure. Office procedures consist of many parallel asynchronous **tasks** related by temporal constraints. There is a need for coordination--a mechanism for informing users of required **tasks** and reminding them of commitments. Finally, since office procedures are not entirely routine, unstructured activities, such as planning and **problem solving** , can occur at various points withing an office procedure [70].

Synchronous group operations are one...

...necessary since group operations impose obligations on the participants and response times vary. A simple **solution** is to let the group **resolve** such difficulties using alternative communications channels, such as audio. The sysstem should at least help...

...group size).

Integration of Activity Support. Asynchronous and synchronous operations are complementary subparts of larger **tasks** or activities. For example, system design projects include both high-level asynchronous **tasks** , such as requirements analysis, and synchronous activity, such as face-to-face **meetings** . A **meeting** proceeds in a largely unstructured way, but it can contain islands of structured synchronous operations--such as voting or **brainstorming** . This calls for integrating support for structured/unstructured activity on the one hand and for synchronous/asynchronous activity on the other. For instance, our voting tool should **store** vote results so that the group can use the results in the context of other...

...tools should look beyond the group and account for factors such as the group's **goals** and its place in the larger context of the organization or society.

Concurrency Control

Groupware systems need concurrency control to **resolve** conflicts between participants' simultaneous operations. With a group editor such as GROVE, for example, one...

...following lists some of the concurrency-related issues facing groupware designers.

* Responsiveness--Interactions like group **brainstorming** and **decision** making are sometimes best carried out synchronously. Real-time systems supporting these activities must not...by great physical distances. With current communications technology, transmission times and rates for wide-area **networks** tend to be slower than for local area **networks** ; the possible impact on response time must therefore be considered. In addition, communications failures are...

...with the newer groupware approaches, which strive for greater freedom and sharing.

Simple Locking

One **solution** to concurrency is simply to lock data before it is written. Deadlock can be prevented...

...moved, or when the key is struck? The system should not burden users with these **decisions** , but it is difficult to embed automatic locking in editor commands. If locks are released...

...user from seeing the intermediate states of others' transactions is in direct opposition to the **goals** of groupware. There has been some work on opening up transactions [4], but the emphasis...consequently, several people act as though they have the floor.

Centralized Controller

Another concurrency control **solution** is to introduce a centralized controller process. Assume that data is replicated over all user **workstations** . The controller receives user requests for operations and broadcasts these requests to all users. Since...

...the same order for all users, all copies of the data remain the same.

This **solution** introduces the usual problems associated with centralized components (e.g., a single point of failure...

...in multiuser systems. Dependency detection uses operation timestamps to

detect conflicting operations, which are then **resolved** manually. The great advantage of this method is that no synchronization is necessary: nonconflicting operations...

...is operation transformation. Used in GROVE, this technique can be viewed as a dependency-detection **solution** with automatic, rather than manual, conflict **resolution** .

Operation transformation allows for high responsiveness. Each user has his or her own copy of...
...along with a state vector indicating how many operations it has recently processed from other **workstations** . Each editor-copy has its own state vector, with which it compares incoming state vectors...

...is not disastrous, but a short transmission time is crucial. Additionally, the telephone and the **workstation** need to be integrated at the system level. Existing prototypes, such as the Etherphone [TM] [82], are promising, but there is no single **network** and addressing scheme with an inclusive protocol suite that is accepted as a standard.

A second problem is inadequate support for multiparty communication [73]. Real-time **computer** **conferences** often require that messages be sent to a specific set of addresses; such restricted broadcasts...

...access control requirements have been described in other literature [27]. For example, if a group **task** is viewed in terms of its participants' roles, access constraints are usefully specified in terms... notify once a line or paragraph is completed. Factors such as performance, group size, and **task** are involved in choosing an appropriate level and style of notification. In general, however, we...

...in a tightly coupled manner, such as when reviewing a document or jointly operating a **spreadsheet** . As the focus shifts from group **tasks** to individual **tasks** --leading toward more asynchronous interaction--coarser notification becomes more appropriate.

Concluding Remarks

We have shown how the conceptual underpinning of groupware--the merging of **computer** and communications technology--applies to a broad range of systems. We have explored the technical...

...designing and building these systems, showing how groupware casts a new light on some traditional **computer** science issues. Information sharing in the groupware context leads, for example, to unexplored problems in...

...take into account a history of expensive and repetitive failure [30]. Applications such as video **conferencing** and on-line calendars have largely been disappointments. These failures are not simply the result...

...system and the group are intimately interacting entities. A substantial literature explores the impact of **computer** technology on organizations and individuals [34,52,53,66]. Ultimately, groupware should be evaluated along...

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...most business people know, concerns the management of resources and environment to reach a specific **goal** . Project management **software** programs are designed to help users handle large and/or multiple projects more easily. These...

We divided project management **software** programs into three categories for our overview: Level I programs offer one or more planning...

...in one issue. So this second part of our three-part series on Project Management **software** covers the remaining 12 Level I packages. THE CONFIDENCE FACTOR: **DECISION** MAKER'S TOOL KIT

The Confidence Factor is billed as a " **decision** maker's tool kit" by Simple **Software** Inc., and for once I've run across a program that lives up to its...

...in the package. In fact, The Confidence Factor includes seven functions to help managers make **decisions** , evaluate alternatives, track projects, and perform other useful **tasks** . Its main event is the flexible Critical Path Method module, but its other modules are...

...program module.

The manual states that The Confidence Factor is designed for managers with no **computer** expertise. I believe this assertion is essentially valid because the system is easy to run...

...don't return when they are supposed to). However, the program runs well in general. **DECISION** SUPPORT MODULES

The non-CPM modules include **Decision** Trees, for evaluating and making **tactical** **decisions** ; Best Alternative, for structuring and **ranking** the issues that affect a **decision** and reaching a conclusion; Risk Simulation, for predicting results; Linear Programming, for finding the optimum approaches to complex **decisions** ; Best Course of Action, for determining the optimal choice among possibilities; and Yes/No **Decisions** , for **ranking** clear alternatives. Most of these modules use a **spreadsheet** -like **matrix** to input data, with full control over cursor position for easy entry and editing. Several...

...thought that you must put into defining the factors that have an impact on a **decision** and **ranking** their **priority** . The Confidence Factor assists in this process by forcing you to think these issues through...

...unusual flexibility and includes several variables not covered by many competitive products at this level. **Task** data are entered on a **matrix** with fields for **task** title, prerequisite **tasks** (normally up to nine, but more if dummy **tasks** are used), duration, cost (direct costs, not manpower costs), and an early start date. The...

...choose. This is a weak method and reduces the utility of the output.

Once the **task** data is entered, The Confidence Factor moves to its

manpower cost section. Up to ten human skills and a cost for each are defined in time **units** the user has **selected** . For example, if days are the unit being used, the cost for one man-day...

...skill would be provided. The Confidence Factor then asks for detailed manpower requirements for each **task** in the project. This is a rather tedious entry process, but it makes you think out each and every **task** in the project. IMPRESSIVE REPORTS

When all the information has been entered, The Confidence Factor...

...any printer that can be connected to a PC. The Gantt chart can also be **displayed** on the **screen** , but it is cumbersome to move around within a large chart. The manual doesn't...

...all, The Confidence Factor can do a variety of useful analyses for a reasonable price. **DECISION** SUPPORT SYSTEM: HIGH-QUALITY GRAPHS

Whether **Decision** Support System (DSS) from General **Software** Corporation, of Landover, Maryland, even belongs in this project management series is a real question...Its high-quality graphs are its only redeeming feature. BUYER BEWARE

GSC believes that any **software** tool that helps in the management of a project qualifies as "project management **software** ," and, on one level, this view certainly makes sense. On the other hand, potential buyers...

...of project management charts: Milestone displays actual and projected dates for the completion of specific **tasks** ; Organization represents interrelationships among the positions in an organization; PERT shows schedule order and **accomplishment** responsibility of project **tasks** ; Earned Value Analysis monitors the cost performance of a contract or project; Trend Analysis plots...

...orientation, I think it is rather strange that DSS outputs to only a few dot **matrix** printers, including ones from IBM, Epson, and IDS, and not to plotters. The program can...

...produce high-quality output, but no plotter drivers are supplied or are currently available. The **matrix** graphics are very good, but plotter output would be far superior. Printer output uses the...

...graphics card to produce its nice on-screen graphics. Unfortunately, the IBM's color-mode **resolution** is insufficient to display the charts in full detail, so DSS uses an every-other...

...user wants to see the entire chart at once. This program really needs the high **resolution** of a Hercules-type monochrome graphics board, but GSC doesn't support this option. DSS...

...into the data-entry and chart-production phase. The system has its own directory of **stored** chart data and includes utilities to reload, rename, delete, and manipulate **stored** files. All data must be entered directly into DSS, though GSC promises a future enhancement...

...the elegance of the design becomes apparent. The documentation, by the way, is a photocopied **word processor** printout, and it has several errors and strange usages. I won't rate it poor good, but plotter output would be far better. The charts are produced quickly.

General **Software** is primarily a consulting firm dealing with the government. DSS has evidently had reasonable success...

...relatively simple user interface.

The Gantt-Pack documentation assumes you know how to use your **computer** and how to make a copy of the distribution diskette. There is no other installation...

...more annoying because they could have easily been avoided.

Since data entry is a critical **task** demanding the utmost in accuracy, you might expect the data entry screen to prompt for...

...defining the various data entry fields. Gantt-Pack allows you to enter not only the **task** but also a name of a phase, which is a large group of **tasks** . I designated **tasks** as being in either preproduction or post-production **decision** phases.

The time element entry format in Gantt-Pack is designed to be flexible, but...

...every following date into day 0+ or sticking with dates and then manually translating every **task** duration into a completion date. You could avoid this translation **task** if you knew you were going to use Gantt-Pack, but predesigning the project description to the program is not always possible.

It is relatively easy to **edit** the **task** data in Gantt-Pack. I added and deleted **tasks** , and the program responded quickly each time. Gantt-Pack cannot automatically take holidays into consideration, nor can it produce resource management reports. SPECIAL FEATURES

Gantt-Pack **software** has been marketed in CP/M and TRS DOS versions since 1978. The PC version printer, so it is possible to put the IBM PC printer or similar dot **matrix** printers into a compressed-print mode. This produces squeezed charts, and their practicality depends upon...
...be easily run in a hard disk system. However, since the entire program resides in **RAM** , the only advantage to using a hard disk system is the speed of data-file...

...is an appropriate program to use if you have a number of parallel or random **tasks** as opposed to serial ones. According to a representative of Gantt Systems, the program has...

...educators for class scheduling. These are appropriate applications because they have many simultaneous or repetitive **tasks** but do not necessarily require a clear critical path. You can enter an unlimited number of open-ended **tasks** into Gantt-Pack.

Four printed products can be produced by Gantt-Pack: a listing of...

...listing of revised data, a fairly standard Gantt chart, and a critical milestone chart highlighting **tasks** that are running late. The critical milestone chart shows the status of the **tasks** as of the date or time the chart was produced. Gantt-Pack defines critical milestones as a special category or group of **tasks** with only an ending date.

A Gantt-Pack special feature is its ability to **sort** the **tasks** according to ten different criteria, including phase, **task** , code, start date, and end date. I didn't like the fact that the Gantt...
...capabilities it provides. However, it may be appropriate for certain applications that incorporate many parallel **tasks** . MICROSOFT PROJECT: GREAT VALUE AT $250

As every space-adventure fan knows, **computer** programs have personalities. Some are easier to take than others. Sometimes the most talented are 50 percent of each day and spend only 20 percent of each day on **task** number 3. Project automatically calculates the total amount of time each resource is used and...

...pour the foundation" project file will automatically be reflected in all

projects that include that **task** .

Another of Project's nice features is its histograms, which show the daily amount of...

...PERT charts. You can't enter the latest finish or "drop dead" date for a **task** . You can't enter fixed costs or income for each **task** .

Then again, no program can have it all. As we gain experience in shopping around...

...the attitude of a seasoned loan officer looking at commercial loan applications: Flashy, new business **ideas** --no matter how promising--may be rejected in favor of simpler proposals from firms with...
...for price. MORGAN PATHFINDER: ONE JOB WELL DONE

In these days of multifunction and multibuck **software** , it is refreshing to find a program like Pathfinder from Morgan Computing Company that does one **task** well and gives a fast payback. Pathfinder may not be glamorous, but it is functional for someone who needs a good Gantt chart and **task** listing with simple computing and printing equipment.

Pathfinder's competency starts with its clear documentation...

...you simply copy two program files from the distribution diskette. Data files then can be **stored** on either the program diskette or any other system diskette. The program also has a...

...doesn't need a lot of explaining. The program accepts only four elements for each **task** : name, beginning event number, ending event number, and time to perform the activity. It won...

...If you hit the Enter key along with one of the single-key entries, the **computer** interprets the Enter as the answer to the next question. This could be inconvenient if...the final one.

Pathfinder's editing function works smoothly and quickly. Various subelements of any **task** can be channged or delected and th e entire problem is automatically reordered and rearranged...
...gain anything in performance since all the executing program and the data are contained in **RAM** .

Pathfinder is an honest and fast $80 program that creates and prints Gantt charts well...

...could pay for itself very quickly. PERTMASTER: A WORKHORSE OF A PROGRAM

PertMaster, from Westminster **Software** Incorporated, is a thoughtfully crafted product fully suited for medium to large planning efforts. Indeed...

...a lot going for it.

PertMaster runs under CP/M with a minimum of 56K **RAM** or PC/MS-DOS with at least 128K **RAM** . It requires one disk drive, but Westminster **Software** suggests two disk drives and recommends a hard disk for large projects. PertMaster provides direct support for the IBM PC-XT, Compaq, **GRID** Compass, Sirius/Victor, and Eagle PC 16-bit models.

Moreover, PertMaster allows up to 1...

...activities per project and 29 resources per activity for a 16-bit machine with 256K **RAM** . An optional version for $895 supports 2,500 activities. 5-MINUTE INSTALLATION

PertMaster installation takes...
...copy the contents of these publisher-supplied disks to my 20-meg hard drive.

Westminster **Software** uses the common protection scheme, which requires that a factory-supplied disk be available in...

...using either the arrow or precedence method. With the arrow method, or Gantt chart, a **task** exists on a line between nodes. In the precedence method, or PERT chart, jobs exist...

...typist or--better yet--by a slow typist with ProKey, by RoseSoft Inc., to make **taske** input even quicker.

PertMaster makes use of function keys and always provides a function key...

...active page.

Another nice feature is PertMaster's abbreviation library. You can establish your own **abbreviations** for **tasks** and resources, and once you enter them in the library, they will be recognized by...report, and an on-screen reporting facility.

The program offers highly flexible time periods, allowing **tasks** to be timed in seconds, minutes, hours, days, shifts, weeks, months, years, or as a unit of completed work periods when several projects are merged.

To add a **task** , you insert the project, its description, and relationships to existing **tasks** . And to delete an existing **task** , you erase the **task** and manually reconstruct the relationships among the remaining **tasks** . NEGATIVE ASPECTS

On the down side, this otherwise excellent package seems to have a serious...

...failed, I ultimately tracked the error to the program's inability to deal with a **task** that erroneously connected an existing node to a nonexistent node, which appeared after the formal...

...fall is said to support plotters and contain an integrated database to facilitate manipulation of **task** -related financial information.

The current version allows planning data to be dumped in ASCII format for transfer to **spreadsheets** or **word processors** .

Overall, I like PertMaster. Error Trapping withstanding, the system is professionally implemented with the user...

...sample, you can work with a complete project without having to key in all the **tasks** . The exercises were clear and helpful; I finished in half an hour. DOCUMENTATION

The manual...

...Data entry is easy and quick, but you must issue the ADD command for each **task** . You cannot simply enter an Add mode and then add one **task** after another.

PRO-JECT 6's nonstandard use of the Tab Key--to advance from...

...data--irritated me. Moreover, the Enter key is used to signal the end of a **task** entry, so if you hit it by accident--and you will hit it--you must go back and **edit** the **task** using the CHANGE command.

The original data for this project called for it to begin in 1968. After I put the first **task** in, an error message announced that the program only recognized dates from 1980 through 1989...

...mention this important fact. I then translated the dates to 1988, but after entering 15 **tasks** , I realized that I would soon hit 1990, and, once again, my schedule would not...

...a newer set of test data ranging from 1985 to 1987. After the twenty-ninth **task** , a new error message appeared: "Project length is now greater than 300 periods--make it...

...in the manual. I attempted to mend matters by removing the start dates from the **tasks** , but the program would not allow it.

But this time, I had wasted nearly 1...

...came at the end of the sample data, which includes two 1/2-day-long **tasks** . PRO-JECT 6 accepts only integer durations, from 0 to 99. I substituted a 1 starts, it took just under an hour to enter all the **tasks** .

The data entry was a little more difficult because the sample data was presented in terms of start and end nodes for each **task** . PRO-JECT 6 prefers to describe **task** relationships in terms of "dependencies," so you must list the **tasks** that must be completed before the current **task** may start. PRO-JECT 6 also assigns a number to each **task** , so I had to use these instead of the **task** labels provided in the sample data. As a result, I had to translate the data before I could enter it.

When I printed the reports, the critical **tasks** were all correctly identified; however, a number of noncritical **tasks** were incorrectly marked as critical. I double-checked the Gantt chart but could find no...

...nearly 12 minutes to print the six pages of the Gantt chart.

I deleted a **task** (number 15) as required by the sample **task** , and PRO-JECT 6 instantly adjusted the critical path calculations. When I went to reinsert the **task** using the same **task** number, I was given an error message for my troubles. I then added the **task** at the end of the list, moved it to its proper place, and checked the...

...my dismay, I found out that PRO-JECT 6 deletes all referces to the deleted **task** in other **tasks** as well. I had to go back and **edit** the **task** that had listed number 15 as a dependency before the critical path was restored. SPECIAL...

...the information you want included in a given report. For example, you can print the **task** description, status, duration, late finish date, and total cost, all sorted by status and subsorted...

...applications. The package doesn't produce fancy charts and graphs, but it does perform useful **network** analysis. PM makes only modest claims and fulfills them all.

PM was written for members...

...to determine the critical path and the amount of float for each activity. The resulting **network** analysis is **displayed** on the **screen** and can be printed out. PM doesn't produce highly sophisticated reports, so if you...

...and Q, and the total project completion time is cut by 2 days. The R **task** can be put back by giving the dummy its original values, and you get the old **network** analysis back.

Thus, you can delete and reinsert activities, but the fact that you have...

...key into CPM.BAS. Once you exit the program, it is gone; you can't **store** data on disk and play with it later. In the real world, where project activities...

...dates. The program assumes a normal distribution of completion dates and calculates the likelihood of **meeting** a particular time schedule.

RESOURCE.BAS is supposed to tell you the best sequence for...

...a PERT chart rather than on the lines between them.

Overall, PM is an unsophisticated **software** package. It may be useful under limited circumstances, but you can't expect much from...

...all due respect to the work that went into it, this is the type of **software** you might find for $25 at a local user's group or even for free ...

...design of the case study, not necessarily because of the program itself. For example, each **task** in the case study is alphabetically labeled, and Project Scheduler 5000 accepts only numeric entires in its **task** code field.

Another reason input of the case study took longer than with some other...

...was that Project Scheduler 5000 allows for extremely detailed entry of resource information on each **task** . You can define up to 96 different resources for each project, including cost per time...

...nonlabor, and the number of units of the resource required for the duration of the **task** . This feature allows careful, realistic planning of resource allocation and budgeting.

One important feature that Project Scheduler 5000 is missing is the ability to produce a **network** analysis diagram, or PERT chart, which was developed, after all, to facilitate an easy look...

...resources and costs.

You enter projects by filling in a number of fields for each **task** and then sending the information to a Gantt chart. Then the program redraws the screen after each **task** entry. This process slows down entry, but in real life, you would naturally pause to look up notations on the next **task** ; therefore, the 5-second delay should not be frustrating in most situations. The program handles deletion, insertion, and addition of **tasks** well, making adjustments to the rest of the project as necessary. FEATURES

The report generation...

...data. Project data can also be output in a DIF format for interfacing with a **spreadsheet** program.

The graphing facility of Project Scheduler 5000 offers some interesting options for presentation of...

...costs for the baseline plan, a revised plan, and actual costs to date.

Graphs are **displayed** on **screen** and can be sent to a printer or plotter with a few keystrokes. This graphing...

...of financial data using graphics than it is to strain your eyes on reams of **spread - sheet** -type printouts. AN EASY-TO-USE PACKAGE

Project Scheduler 5000 is an easy-to-use project planning package with truly outstanding graphic capabilities. The package does not do **network** analysis but effectively uses the critical path method. Project Scheduler 5000 is a good package for you to consider purchasing if its features meet your project planning needs. TARGET **TASK** : ANSWERING THE 'WHAT IF'

Answering "what if" questions is one of the microcomputer's most...

...preparing a Grantt chart, and writing management estimates are useful planning exercises, but using a **computer** to answer "what if" questions prepares you for the real world of late deliveries and broken promises. TARGET **TASK** , distributed by Comshare, Inc., can help you answer "what if" questions about the monetary and schedule impacts of changed deadlines and late or early deliveries.

The TARGET **TASK** manual is written clearly and includes both a practical guide to program planning and PERT chart construction and clear descriptions of the various portions of the program. **Screen displays** and reports are provided along with the text describing your options. Sample models, internal glossaries...

...the program itself has good prompts and well-designed screens. THE PC MAGAZINE PROJECT

TARGET **TASK** is menu-driven. Menu presentations are well organized and include help screens for every option...

...screen gives you a clear picture of information you must supply for a given project **task** . Each entry is checked for validity. If you repeat an entry, an error message tells...

...feature of the input screen is that you can't back up and see the **tasks** you entered previously. Reviewing your work is useful, for example, if you are interrupted and lose your place in the **task** list. The screen will tell you how many inputs you made, but nothing beats seeing your previous work.

When you enter **tasks** into TARGET **TASK** , the program asks for optimistic, normal, pessimistic, and crash completion times. It also asks for an estimate of the average cost to complete a **task** and the cost of a crash effort. These various estimates will allow you later to...

...As I went along, I made up estimates of the effectiveness and cost of expediting **tasks** in the PC model. If you build a model using TARGET **TASK** , it is well worth the effort you will expend to develop good estimates of the various timing and cost factors.

The TARGET **TASK** **software** can't project manpower requirements, print PERT charts, or directly show the funding schedule, but...

...what will happen to your project if you compress or extend the completion dates. TARGET **TASK** produces the **task** list, Gantt charts, and a comprehensive management report. The changes specified in the PC project were easy to make. You use the original numbered **task** nodes in your model to specify the **tasks** you want to change or delete. The Gantt chart was recalculated in a matter of...

...holidays already built in. The only anomaly I found was that the calendar in TARGET **TASK** would not accept the 1968 starting date specified for the PC model. The authors apparently did not expect you to chart anything that happened before they wrote the program.

TARGET **TASK** takes quite a while to prepare its management report. The program computed and printed for about 40 minutes while it described the details of each **task** . It also came up with the maximum number of days the **task** could be delayed without affecting the completion date of succeeding **tasks** .

Each time you run the TARGET **TASK** **software** , it displays a series of cost/time values. This list shows you how much it...

...the project within a certain time based on the expediting charges you entered into each **task** . The list shows various combinations of the most pessimistic and optimistic predictions. When you generate...

...exercises with the project by changing the optimistic and pessimistic dates and costs for specific **tasks** , generating the model, and then printing charts for various maximum time periods. Each one of...

...for a selected period will display reduced float times and changed costs. HARDWARE REQUIREMENTS

TARGET **TASK** will run in a system with as little as 128K **RAM** and

one disk drive. The number of **tasks** you can enter is **limited** only by the **RAM** size of your **computer** . The program displays the number of **tasks** it can accept on the top of the input screen. When the program ran in my 512K PC, it could take 531 **tasks** .

The PC-DOS version of TARGET **TASK** does not use the PC special function keys, color, or graphics. It can print its...

...or thimble machines. The program is not copy-protected and it runs well on a **computer** equipped with a hard disk. Files can be saved and loaded from any drive in the system, project directories can be displayed, and existing files can be erased.

TARGET **TASK** is well-designed and well-written **software** . The screens effectively guide you through the operation, and the program forgives errors. At $329...

...fairly priced and will allow you to perform real "what if" studies of your project. **TASKPLAN** : WHAT DO YOU WANT FOR FREE? **Task** Plan is little threat to mainstream project management programs. The spare-time creation of San Jose engineer C. Lamar Williams, **TaskPlan** records a project of up to 50 **tasks** spread over 60 time periods, calculated cost for each time period, keeps a running tally of all project costs, and provides a histogram of the results.

Unfortunately, **TaskPlan** focuses on tracking expenses and neglects the broader area of managing personnel, materials, and deadlines...

...will find that this lack of features precludes using the program for serious project planning.

TaskPlan is available for the asking. Send a disk and a prepaid mailer to Williams **Software** & Services, try it out, and, if you like it, send along $20. INSTALLATION

There are...

...for installation; it's a straightforward process. Copy the two files from the original disk (**TASKPLAN** . Bas and SAMPLE. TPN) onto a working disk, copy BASICA from your own DOS disk...

...0/2.1), and you're in business. Elaped time: about 3 minutes. To start **TaskPlan** , type BASICA, hit Enter, and load **TASKPLAN** . BASICA. **TaskPlan** requires one disk drive and 96K **RAM** . Color or monochrome monitors work equally well; there are no graphics except for the PC...
...128 ASCII characters, so no special graphics printer is required.

No tutorial is provided with **TAskPlan** , but loading the eight- **task** sample file and manipulating the sample data for an hour or two will give you a feeling for how **TaskPlan** works.

TaskPlan 's documentation consists of a 14-line label on the disk envelope and two Screens...

...Shift-PrtSc combination. Even by
free-but-send-a-few-bucks-if-you-like-it **software** standards, that's a bit Spartan. THE CASE STUDY

After loading **TaskPlan** , the user is promtped for a general project name, the number of **tasks** (2-50) and time periods (2-60), a choice of normal rounding or "conservative" rounding...

...upward), and two cost multipliers. The MI multiplier can be fixed or allowed to vary **task** -by- **task** (to allow for extra overhead on some **tasks**). Using the m2 **multiplier** rounds the costs you input into different output cost; for instance, using .001 as the...

...and a .001 multiplier, a $5,420 cost would be rounded up to $6(000).

Tasks can be entered on a data-entry screen in groups of ten. Each **task** get a name of up to 20 characters, a start time ranging from 0 to 59.99 (**TaskPlan** allows scheduling in terms of up to 60 user-specified time units), an end time...

...a cost (up to $9,999,999.99, or higher using exponentiation), and a cost **multiplier** if a **task** -by- **task** **multiplier** was chosen. **TaskPlan** lacks full-screen **editing** ; mistakes within a field can be corected by backspacing if the Enter key hasn't...

...Otherwise, you have to wait until after you've entered a group of ten tasks, **at** which point TaskPlan **offers** a chance to correct typing or data-entry errors. The process is sluggish and a bit awkward.

Once all tasks **have** been entered, TaskPlan **allows** the data to be saved to disk and calculates and displays costs for each of costs (C), and C/I.

Finally, TaskPlan **offers** to print the raw data, a cost summary, and a histogram.

I chose to use...

...the case-study data had to be spread over two files because it exceeded TaskPlan' **s** 50-task **limit** **and** required over 60 week-long periods.

From start to finish, the project took about 3...
...less time, but a glitch on the very last entry of one file sent TaskPlan **into** a tailspin, so I had to enter the data again. Here's what happened: I inadvertently entere 60.00 as the start time for the last task. **A** checking routine requires the end of each task **be** at least .01 time units later than the beginning time. But (Catch 22!) another routine...

...unable to back up a step in the data entry, I had only one solution: **to** reboot the system.

A task **can** be deleted by inserting a dummy task **with** a cost of 0 and minimal time (.01 units) in its place. Moving the task **is** accomplished **by** changing start and end times; since TaskPlan **doesn** 't sort **by** date, there's no need or easy way to move the physical location of a task **within** the data file. To add tasks, **you** must rerum TaskPlan, **choose** the "Use previous project" option, and add the tasks.

Of all the reports one might expect from a well-rounded project manager, TaskPlan **generates** only the task **list** (unsorted), an incremental and cumulative costs list (a funding schedule), and a histogram. Gantt and...

...written in BASIC, there are few bells and whistles.

One unadvertised feature is that TaskPlan **data** can be generated using the nondocument mode of a word **processor** **or** even a database that can convert its output to comma-delimited files. If you did find a continuing use for TaskPlan, **this** would considerably speed up the data-entry procedure.

Each task **would** be entere like this (alphabetic entries must be surrounded with quotation marks):

"Task **name** ," start time, end time, cost<Enter>.

Variable cost multiplier (**if** use)

<Enter>. Precede th task **data** with this header:

"Project name," number of tasks, **number** of time periods, "N" or "C" (for norma or conservative rounding),

"C" or "V" (for a constant or variable

M1 cost multiplier), actual M2 cost multiplier< **Enter** >. OPINION

TaskPlan **begs** the question: "Why does this program exist?" if you're serious about managing a project...

...quickly out-weighs the attractiveness of its low price. What you get out of TaskPlan **might** be less than the effort you have to put in.

TaskPlan **addresses** only a limited **area** of project management: recording and tallying costs when you already have a good idea **of** what the ocsts will be. Any self-respecting spreadsheet **or** database could do the same work, but without pausing to catch its breath or suffering the artifical restraints of 50 tasks **and** 60 time periods.

VisiSchedule is a fast interactive, visually oriented project planning and scheduling program...

...start and finish dates, slack time, prerequisite jobs, manpower required by skill category, the computer **manpower** cost, the direct cost, and whether or not the job is on the critical path. Printing this report for the 60 or so tasks **in** the case study took 20 minutes on my Epson MX-80 printer.

The other large...Project Description report and the Schedule graph.

EASE OF USE

Adding, deleting, and inserting tasks **took** no discernible processing time. The only delay in these operations was caused when the screen was refreshed to show the updated task **list** .

VisiSchedule's nested menus make working with the program very easy. It presents information pertinent...

...description, but you do not control the number assigned. In the case study, the tasks **are** named by the originating and terminating nodes. Since I couldn't make use of this naming system, I had to renumber the tasks **in** order to build my own listing of dependencies and anticipate VisiSchedule's number approach; it does not force you to draw a network **diagram** .

VisiSchedule lacks the capacity to handle the case study in two areas. First, it cannot...

...within these limitations, I allocated a full day to each of the half-day tasks **and** grouped many responsibility codes into skill category 9 as a catch-all.

VisiSchedule has many...

DESCRIPTORS: **Software** --...

... **Decision** -making...

... **Computer** programs

TRADE NAMES: **Decision** Support System (**computer** program...

...Gantt-Pack (**computer** program...

...Microsoft Project (Project management **software**)--...

...Morgan Pathfinder (**computer** program...

...Pertmaster (**computer** program...

...Pro-ject 6 (**computer** program...

...Project Management (**computer** program...

...Project Scheduler 5000 (**computer** program...

... **Taskplan** (**computer** program...

...Target **Task** (**computer** program...

...Visischedule (**computer** program...

...The Confidence Factor (**Computer** program
19841103

22/3,K/50 (Item 3 from file: 148)
DIALOG(R)File 148:Gale Group Trade & Industry DB

10617985 SUPPLIER NUMBER: 21266390 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Technology for group decision **making: how Fairfax County redesigns financial processes.**
Higgins, John D.; Hill-Wilson, Sharron; Planchon, Susan S.
Government Finance Review, v14, n5, p13(4)
Oct, 1998
ISSN: 0883-7856 LANGUAGE: English RECORD TYPE: Fulltext; Abstract
WORD COUNT: 3290 LINE COUNT: 00264

Technology for group decision **making: how Fairfax County redesigns financial processes.**

...ABSTRACT: Using Group Systems to Redesign the Year End Business Process' called for the use of **software** and a local area **network** in the conduct of electronic **meetings** . The program is aimed at making financial managers overcome the challenge of understanding their clients...

TEXT:

The authors describe how " **meetingware** " was used to redesign financial processes in Fairfax County, Virginia.

... Redesign the Year End Business Process." This program involved the use of a local area **network** and commercially available **software** to conduct electronic **meetings** to examine and improve the year-end process. The success of the **task** and the portability of the techniques make this use of technology an inviting prospect for successfully **meeting** one of the most consistent challenges faced by financial managers: understanding the needs of their customers and hearing **ideas** from all areas of the organization.

Time is one of the few commodities which cannot...

...recycled, or replaced. In large and small organizations alike, it is lost each day to **meetings** which are less than fully productive. That, of course, translates to lost money. One could estimate the total hourly wage of employees in a **meeting** and assign the total amount to the product of the **meeting** . One could then conclude, "We just spent $850 to agree that we have a problem, yet we are no closer to a **solution** than when the **meeting** convened." This is not an atypical outcome; however, it does not need to be that...

...agony that was to be survived rather than conquered. Multiple group planning sessions, long plenary **meetings** with representatives from all county agencies, and Department of Finance processing sessions lasting well into...

...The problem was that planning sessions barely scratched the surface of the creativity and practical **ideas** among county staff. In addition, **meetings** were long and too few of the right people contributed. That was the real problem.

Need for Effective **Meetings**

Much has been written about how to conduct effective **meetings** . Steps to conduct effective **meetings** are generally well-known: use a written agenda; clearly state the **meeting** 's **objective** at the beginning; appoint a facilitator to keep the discussion on track and to encourage full participation; record minutes; demand respect for dissenting opinions; summarize what was said and describe **decisions** taken; and, distribute minutes with a description of any follow-up actions. Why, then, is...

...every time teams or staff assemble?

Most leaders have a number of explanations for why **meetings** are inefficient. It can be difficult to **limit** **meetings** to crisp dialogue on only the topic addressed in the agenda. Discussions get sidetracked easily ...

...more focused discussions, they also have a far smaller net with which to harvest fresh **ideas** and creative **solutions** .

A very frequent problem in **meetings** is that one or more participants dominate the discussion. This is often because they are the "experts" or the ones with the most information, but the best **ideas** often come from the most unexpected sources. Another source of problems in **meetings** is interpersonal disruptions and hidden agendas perhaps stemming from professional rivalries, personality clashes, or an...

...Whatever the cause, the effect is too often the same: diversion of energy from the **task** at hand.

Electronic **Meetings**

For **several** years Fairfax County has been using electronic **meetings** to improve group performance and to foster teamwork. These electronic **meetings** are supported by a relatively new genre of **software** often called " **meetingware** ." However, sometimes the **idea** of looking to technology to solve people problems seems repugnant to the experienced public manager. Do these techniques work by fostering positive habits at **meetings** ? Fairfax County has found this to be the case.

There are three elements to the way **meetingware** (referred to as the Group **Decision** Support System or GDSS) is used in Fairfax County.

* Groups meet in a Fairfax County facility equipped like many personal **computer** training rooms, but furnished and configured to maximize the electronic **meeting** . Each participant has a personal **computer** linked in a local area **network** . The **computer** monitors are housed below the **desktop** , providing each person complete privacy. There is a large public **display** **screen** for certain group activities. Individual **workstations** are arranged in a U-shape, simulating a traditional **conference** table arrangement, physically bringing the group from isolated input to an eye-to-eye team environment.

* Commercial off-the-shelf **software** developed especially for this purpose leverages the capabilities of the **network** . More than an electronic notebook and communication device, the **software** organizes the work group, smoothly leading it through team activities such as brainstroming, categorizing, and voting at a pace rarely achieved in traditional **meetings** . It provides for alternative analysis and statistical support that quickly arrange **ideas** in patterns focused on the **meeting** 's **goals** or simply tells the team when they have reached **consensus** and it is time to move on.

* A trained facilitator leads group sessions serving as a bridge between the technology and the team, sharing successful **strategies** from earlier uses of the system. Individuals from within the ranks of the county are volunteer facilitators who have been trained in group dynamics, the **software** , and the techniques used in the GDSS. Three facilitators from the Department of Finance, one of whom led the year-end project, are available to other county agencies.

Meetingware

There are a number of good commercial **meetingware** applications on the market. The Fairfax program was initiated through a research grant in conjunction with George Mason University. Most **meetingware** applications offer the group the opportunity for:

* **brainstorming** ,

* organizing **ideas** ,
* developing group outlines,
* voting,
* **ranking** preferences, and
* feedback.

The most important part of the program for working on the year...

...bruised egos as participants get a dose of reality regarding their heretofore commanding presence in **meetings** . But that is one of the major assets of the electronic **meeting** . Groups evaluate **ideas** on their own merit rather than on the weight of authority or strength of personality... ...Moreover, criticism becomes much easier to digest in this environment. No one knows where an **idea** came from, and any criticism is of the **idea** itself, not the person who offered it. Likewise, everyone feels free to express honest opinions about **ideas** because they know their comments will not be taken personally.

The GDSS In Action

To visualize the potential benefit of using GDSS, consider how the project would progress using traditional **meeting** techniques. Three groups of 20 knowledgeable financial system users were scheduled to separately participate in...

...obtain feedback and suggestions on 25 selected aspects of the year-end closing process. The **task** was to solicit from each person comments, criticism, and suggestions. In a traditional group **meeting** , this **task** alone would take days to complete. It would go something like this: Participants would assemble in a large **conference** room and would be asked to provide some 75 comments, three in each of 25...

...entire group so that each participant might consider what others have said in generating additional **ideas** . Participants would then be asked to **rank** good **ideas** in order of their importance or value. The sheer time it would take to go around the room to hear the **ideas** makes this a daunting **task** .

Using GDSS, the three groups averaged one hour and ten minutes to complete the **task** . Sitting at their individual **computer** , each participant viewed the 25 topics on the public **display screen** , selecting the topics on which they wished to comment. They had the opportunity to see...

...action by the Department of Finance in implementing change.

In the second phase of the **meeting** , participants were asked to identify critical success factors. The same **brainstorming** technique was used. For the most part, the **ideas** generated were not new, but perhaps for the first time, the Department of Finance was...

...complete an on-line survey asking about written year-end instructions, the annual kick-off **meeting** , and the time needed to complete year-end activities. They were given 12 statements and...far better chance staff would be freed from routine duties to attend.

Selection of Electronic **Meeting**

The Department of Finance was an early supporter of GDSS. Three people from the Department...

...groups were assembled from across the county. Each session lasted one-half day and the **goals** were straightforward.

1) List from the users' perspective critical success factors.
2) Identify activities already...

...be inadequate for planning workflow and activities. For example, each

year the department published a **matrix** of year-end activities to serve as a planning guide for agencies. It was found that users simply transferred information from this **matrix** to their wall calendars. It was determined that it could be published in a calendar...

...departments was leveraged by the new calendar.

Immediate Results

By using GDSS, the quantity of **ideas** generated was far greater than that obtained in planning sessions. Also, by using this technique, no **idea** was lost or suppressed and team members commented that real-time viewing of posted comments inspired new **ideas** . Of particular value was the observation that every suggestion and comment received an unbiased evaluation...

...so in another format."

"Seeing the comments of other people helped me come up with **ideas** ."

"Opportunity to comment honestly without feeling you are being put on the spot."

"I liked being able to see results immediately."

"We **accomplished** a lot in the **meetings** that would not have been possible otherwise."

"Ensures full participation by each member without limiting...

...an average of 91 percent. Boeing Corporation tracked the results of 64 groups using electronic **meetings** to define requirements for the shop floor for an aircraft in production. The result was...

...more and more organizations discover ways to apply this technology to the everyday business of **meetings** .

Conclusions

Fairfax County found that the GDSS technique can lead to process improvement. In particular...

...DESCRIPTORS: **Decision** -making, Group...

...Local area **networks** --

...PRODUCT/INDUSTRY NAMES: 7372640 (Electronic Commerce **Software**); ...

...3661205 (Local Area **Networks**)

19981000

22/3,K/54 (Item 7 from file: 148)
DIALOG(R)File 148:Gale Group Trade & Industry DB

08573128 SUPPLIER NUMBER: 18155259 (USE FORMAT 7 OR 9 FOR FULL TEXT)
OnTime Enterprise minds meetings , **with a few quirks. (Campbell Services' OnTime Enterprise 3.0** network **scheduler** software **) (Software Review) (Evaluation)**
Kvitka, Andre
InfoWorld, v18, n14, pN7(1)
April 1, 1996
DOCUMENT TYPE: Evaluation ISSN: 0199-6649 LANGUAGE: English
RECORD TYPE: Fulltext; Abstract
WORD COUNT: 1159 LINE COUNT: 00095

OnTime Enterprise minds meetings , **with a few quirks. (Campbell Services' OnTime Enterprise 3.0** network **scheduler** software **) (Software Review) (Evaluation)**

ABSTRACT: Campbell Services' OnTime Enterprise 3.0 **network** scheduler **software** improves on its predecessors, but does not fulfill its potential. OnTime features a vastly improved...

...tab dialog boxes, resource scheduling and toolbars with tool tips. OnTime also allows in-place **editing** and features consistent appointments and **task** dialog boxes. However, OnTime only supports NetWare and Banyan System's Vines **network** operating systems, eliminating it as an option for organizations with multiple Macintosh or Unix **servers** . OnTime offers excellent group and resource scheduling tools, making it extremely easy to schedule group **meetings** .
... and-drop support.
Cons: Limited personal information management through Phone Book, a separate application; limited **network** operating system support.
Campbell Services Inc., Southfield, Mich.; (800) 559-5955, (810) 559-5955; fax...

...rest of the program. Administrators must rely on a DOS-based utility to monitor the **server** portion, as well. (A Windows-based utility is in the works.) Though OnTime Enterprise is...

...tool tips, tab dialog boxes, and resource scheduling. You can now also perform in-place **editing** , and the appointments and **tasks** dialog boxes are consistent. The dialog boxes for the **meeting** originator and the attendee are now the same, as are those for modifying all occurrences of a recurring **meeting** . In addition, you can now open multiple calendars instead of just one. Campbell Services has...
...Banyan System Inc.'s Vines, which means that administrators with large Macintosh- or Unix-based **server** installations will have to consider other group scheduling **software** , such as CE **Software** Inc.'s **Network** Scheduler or On Technology Corp.'s **Meeting** Maker. (OnTime does support Macintosh clients, though.)
Campbell Services has announced a Windows NT version...

...with OnTime Enterprise for NetWare via TCP/IP and will support user-directory import from **e - mail** **software** such as Lotus Development Corp.'s cc:Mail, Microsoft Corp.'s Microsoft Mail, and the...

...Loadable Module, I had to update some of the files on my NetWare 3.12 **server** . Campbell Services thoughtfully provides a disk of the NetWare files that you may need to upgrade your **server** . The installation

procedure for the **server** and the Windows 3.1 and Windows 95 clients went smoothly thanks to OnTime's installation wizards and accurate documentation.

A DOS-based utility lets you perform all administration **tasks** for the OnTime **servers** from one central location. Campbell Services has added statistical features to more easily track OnTime...

...for improvement. The default view of the interface packs a lot of information onto the **screen** . OnTime **displays** an appointment section at the top of the screen, **tasks** at the bottom, and a three-month calendar view on the right.

Other items include...

...bottom. I could adjust the screen to show just the appointment section or just the **tasks** section, but the interface remained a bit cluttered. Also, a large banner displaying the current...

...time slot.

I didn't like that double-clicking in the empty space of the **tasks** window brought up the **edit** window for the existing **task** that happened to be highlighted. For consistency's sake, I would have preferred that OnTime open a new **task** window.

A separate Phone Book module integrates clumsily with the OnTime program. For example, I...

...Phone Book, then use a "create calendar entry" feature to transfer that person to my **task** list. OnTime then treats the entry as a **task** , not a call, so the program does not automatically associate any notes I made while performing the "call" **task** with the entry in the Phone Book.

The group and resource scheduling tools work well. You simply select **meeting** attendees from the list of OnTime users, then determine an available time slot by examining...clients using an administration utility.

I like how easy it is to schedule a group **meeting** , but I do have a few quibbles.

While setting up a 3-hour group **meeting** , I switched from the day view to the week view. Upon returning to the day view, I found the program had shrunk my **meeting** duration to 30 minutes when my default appointment time setting was set for 1 hour...

...to attach a document, so that attendees could browse through the material prior to a **meeting** .

New in OnTime Enterprise 3.0 for NetWare

* Improved user interface
* Windows 95 compatibility
* Support for drag and drop
* Ability to read and write to group scheduling **grids**
* Consistent dialog box for appointments and **tasks**
* Ability to open **multiple** calendars simultaneously
* Support for banners

INDUSTRY CODES/NAMES: CMPT **Computers** and Office Automation
...DESCRIPTORS: **Computer** programs
PRODUCT/INDUSTRY NAMES: 7372690 (Communications **Software** NEC)
TRADE NAMES: OnTime Enterprise for NetWare 3.0 (Workgroup **software**)--
19960401

```
Set     Items   Description
S1    5338423   BRAINSTORM? OR BRAIN()STORM? OR PROBLEM()(SOLVE? OR SOLVING
           OR SOLUTION?) OR HASH()SESSION? OR CONFERENC? OR MEETING? OR
          COMMITTEE? OR GROUPTHINK? OR GROUP()THINK? OR TELECONFER? OR -
          VIDEOCONFER? OR TROUBLESHOOT? OR TROUBLE()SHOOT? OR ...
S2    4782835   THOUGHT()RESULT? OR IDEA? ? OR TACTIC? OR STRATEG? OR CONS-
          ENSUS?
S3    6918044   SOLUTION? ? OR RESOLUTION? ? OR RESOLV??? OR DECISION? OR -
          OBJECTIVE? ? OR TASK? ? OR AIM OR AIMS OR GOAL? ? OR ACCOMPLI-
          SH?
S4    1666512   COMPUTER? OR MICROPROCESS? OR MICRO()PROCESS? OR DATA()PRO-
          CESS? OR WORD()PROCESS?
S5     692438   TERMINAL? OR SERVER? OR DESKTOP? OR DESK()(TOP OR TOPS) OR
          WORKSTATION? OR WORK()STATION?
S6      28068   CPU OR CENTRAL()PROCESS? OR PROCESS?()UNIT?
S7      32030   CRT OR CATHODE()RAY()TUBE? OR DISPLAY?(2N)(MEDIUM OR MEDIA
          OR DEVICE? OR APPARATUS? OR SCREEN? OR MONITOR?)
S8    1928028   MEMORY? OR STORE? OR STORING OR STORAGE OR RAM
S9    4022370   INTERNET? OR NETWORK? OR EMAIL? OR E()MAIL? OR LAN OR WAN -
          OR ETHERNET? OR INTRANET? OR EXTRANET?
S10   1479067   SOFTWARE? OR SOFT()WARE? OR SPREADSHEET? OR SPREAD()SHEET?
S11     40224   (SELECT? OR PARTICIP? OR SUBJECT? OR THOUGHT?)(3N)(CELL? OR
           UNIT? OR BLOCK?)
S12    143278   MATRIX? OR MATRIC? OR GRID? ? OR CIRCLE()GRAPH? OR FAN()SH-
          APE?
S13   2773777   NARROW? OR ATTENUAT? OR FILTER? OR CULL? OR STREAMLIN? OR -
          STREAM()(LINE? OR LINING) OR PARE? OR PARING OR WHITTL? OR ED-
          IT??? OR REDACT? OR TRIM? OR PRUNE? OR PRUNING
S14   4920234   CONDENS? OR LIMIT? OR RESTRICT? OR REFIN? OR REDUC? OR DIS-
          TILL? OR BOIL?()DOWN OR ABBREVIAT?
S15   2062285   RANK? OR SORT? OR HIERARCH? OR PRIORIT? OR CATEGORIZ? OR C-
          ATEGORIS?
S16       243   S1:S3 AND S4:S6 AND S7 AND S8 AND S9 AND S10 AND S11:S12
S17        20   S16 AND S13:S15(5N)S2:S3
S18        77   S16 AND S1 AND S2:S3
S19        85   S17:S18
S20        22   S19 AND PY<2000
S21        22   RD (unique items)
? show files
File  20:Dialog Global Reporter 1997-2004/Jul 20
         (c) 2004 The Dialog Corp.
?
```

```
Set     Items   Description
S1    2962031   BRAINSTORM? OR BRAIN()STORM? OR PROBLEM()(SOLVE? OR SOLVING
               OR SOLUTION?) OR HASH()SESSION? OR CONFERENC? OR MEETING? OR
              COMMITTEE? OR GROUPTHINK? OR GROUP()THINK? OR TELECONFER? OR -
              VIDEOCONFER? OR TROUBLESHOOT? OR TROUBLE()SHOOT? OR ...
S2    6390504   THOUGHT()RESULT? OR IDEA? ? OR TACTIC? OR STRATEG? OR CONS-
              ENSUS? OR SOLUTION? OR RESOLUTION? OR RESOLV? OR DECISION? OR
              OBJECTIVE? OR TASK? OR AIM OR AIMS OR GOAL? ? OR ACCOMPLISH?
S3    3068118   COMPUTER? OR MICROPROCESS? OR MICRO()PROCESS? OR DATA()PRO-
              CESS? OR WORD()PROCESS?
S4    1137475   TERMINAL? OR SERVER? OR DESKTOP? OR DESK()(TOP OR TOPS) OR
              WORKSTATION? OR WORK()STATION?
S5      58571   CPU OR CENTRAL()PROCESS? OR PROCESS?()UNIT?
S6      56936   CRT OR CATHODE()RAY()TUBE? OR DISPLAY?(2N)(MEDIUM OR MEDIA
              OR DEVICE? OR APPARATUS? OR SCREEN? OR MONITOR?)
S7    1631224   MEMORY? OR STORE? OR STORING OR STORAGE OR RAM
S8    4417040   INTERNET? OR NETWORK? OR EMAIL? OR E()MAIL? OR LAN OR WAN -
              OR ETHERNET? OR INTRANET? OR EXTRANET?
S9    2194560   SOFTWARE? OR SOFT()WARE? OR SPREADSHEET? OR SPREAD()SHEET?
S10     46755   (SELECT? OR PARTICIP? OR SUBJECT? OR THOUGHT?)(3N)(CELL? OR
               UNIT? OR BLOCK?)
S11    156819   MATRIX? OR MATRIC? OR GRID? ? OR CIRCLE()GRAPH? OR FAN()SH-
              APE?
S12   2905843   NARROW? OR ATTENUAT? OR FILTER? OR CULL? OR STREAMLIN? OR -
              STREAM()(LINE? OR LINING) OR PARE? OR PARING OR WHITTL? OR ED-
              IT??? OR REDACT? OR TRIM? OR PRUNE? OR PRUNING
S13   4122518   CONDENS? OR LIMIT? OR RESTRICT? OR REFIN? OR REDUC? OR DIS-
              TILL? OR BOIL?()DOWN OR ABBREVIAT?
S14   1077705   RANK? OR SORT? OR HIERARCH? OR PRIORIT? OR CATEGORIZ? OR C-
              ATEGORIS?
S15    719636   COLOR? OR COLOUR?
S16   4537770   PLURALIT? OR MULTIPL? OR SEVERAL? OR MULTITUD? OR MORE()TH-
              AN()ONE OR "MORE THAN ONE" OR NUMEROUS? OR MANY
S17      1463   S1:S2 AND S3:S5 AND S6 AND S7:S8 AND S9 AND S10:S11
S18       337   S17 AND S1 AND S2 AND S7 AND S8
S19      1463   S17:S18
S20       181   S19 AND S12:S14(5N)S1:S2
S21       324   S19 AND S16(5N)S1:S5
S22       449   S19 AND S15(5N)(S1:S2 OR S10:S11)
S23       203   S18 AND S20:S22
S24       127   S23 AND PY<2000
S25        98   RD (unique items)
S26        42   S19 AND S9(5N)S1
S27        21   S26 NOT S23
S28        19   S27 AND PY<2000
S29        14   RD (unique items)
? show files
File 436:Humanities Abs Full Text 1984-2004/Jun
         (c) 2004 The HW Wilson Co
File 476:Financial Times Fulltext 1982-2004/Jul 21
         (c) 2004 Financial Times Ltd
File 610:Business Wire 1999-2004/Jul 21
         (c) 2004 Business Wire.
File 613:PR Newswire 1999-2004/Jul 21
         (c) 2004 PR Newswire Association Inc
File 621:Gale Group New Prod.Annou.(R) 1985-2004/Jul 21
         (c) 2004 The Gale Group
File 624:McGraw-Hill Publications 1985-2004/Jul 20
         (c) 2004 McGraw-Hill Co. Inc
File 634:San Jose Mercury  Jun 1985-2004/Jul 20
         (c) 2004 San Jose Mercury News
```

File 636:Gale Group Newsletter DB(TM) 1987-2004/Jul 21
(c) 2004 The Gale Group
File 810:Business Wire 1986-1999/Feb 28
(c) 1999 Business Wire
File 813:PR Newswire 1987-1999/Apr 30
(c) 1999 PR Newswire Association Inc
?

```
Set     Items   Description
S1    2962031   BRAINSTORM? OR BRAIN()STORM? OR PROBLEM()(SOLVE? OR SOLVING
               OR SOLUTION?) OR HASH()SESSION? OR CONFERENC? OR MEETING? OR
              COMMITTEE? OR GROUPTHINK? OR GROUP()THINK? OR TELECONFER? OR -
              VIDEOCONFER? OR TROUBLESHOOT? OR TROUBLE()SHOOT? OR ...
S2    6390504   THOUGHT()RESULT? OR IDEA? ? OR TACTIC? OR STRATEG? OR CONS-
              ENSUS? OR SOLUTION? OR RESOLUTION? OR RESOLV? OR DECISION? OR
              OBJECTIVE? OR TASK? OR AIM OR AIMS OR GOAL? ? OR ACCOMPLISH?
S3    3068118   COMPUTER? OR MICROPROCESS? OR MICRO()PROCESS? OR DATA()PRO-
              CESS? OR WORD()PROCESS?
S4    1137475   TERMINAL? OR SERVER? OR DESKTOP? OR DESK()(TOP OR TOPS) OR
              WORKSTATION? OR WORK()STATION?
S5      58571   CPU OR CENTRAL()PROCESS? OR PROCESS?()UNIT?
S6      56936   CRT OR CATHODE()RAY()TUBE? OR DISPLAY?(2N)(MEDIUM OR MEDIA
              OR DEVICE? OR APPARATUS? OR SCREEN? OR MONITOR?)
S7    1631224   MEMORY? OR STORE? OR STORING OR STORAGE OR RAM
S8    4417040   INTERNET? OR NETWORK? OR EMAIL? OR E()MAIL? OR LAN OR WAN -
              OR ETHERNET? OR INTRANET? OR EXTRANET?
S9    2194560   SOFTWARE? OR SOFT()WARE? OR SPREADSHEET? OR SPREAD()SHEET?
S10     46755   (SELECT? OR PARTICIP? OR SUBJECT? OR THOUGHT?)(3N)(CELL? OR
               UNIT? OR BLOCK?)
S11    156819   MATRIX? OR MATRIC? OR GRID? ? OR CIRCLE()GRAPH? OR FAN()SH-
              APE?
S12   2905843   NARROW? OR ATTENUAT? OR FILTER? OR CULL? OR STREAMLIN? OR -
              STREAM()(LINE? OR LINING) OR PARE? OR PARING OR WHITTL? OR ED-
              IT??? OR REDACT? OR TRIM? OR PRUNE? OR PRUNING
S13   4122518   CONDENS? OR LIMIT? OR RESTRICT? OR REFIN? OR REDUC? OR DIS-
              TILL? OR BOIL?()DOWN OR ABBREVIAT?
S14   1077705   RANK? OR SORT? OR HIERARCH? OR PRIORIT? OR CATEGORIZ? OR C-
              ATEGORIS?
S15    719636   COLOR? OR COLOUR?
S16   4537770   PLURALIT? OR MULTIPL? OR SEVERAL? OR MULTITUD? OR MORE()TH-
              AN()ONE OR "MORE THAN ONE" OR NUMEROUS? OR MANY
S17      1463   S1:S2 AND S3:S5 AND S6 AND S7:S8 AND S9 AND S10:S11
S18       337   S17 AND S1 AND S2 AND S7 AND S8
S19      1463   S17:S18
S20       181   S19 AND S12:S14(5N)S1:S2
S21       324   S19 AND S16(5N)S1:S5
S22       449   S19 AND S15(5N)(S1:S2 OR S10:S11)
S23       203   S18 AND S20:S22
S24       127   S23 AND PY<2000
S25        98   RD (unique items)
? show files
File 436:Humanities Abs Full Text 1984-2004/Jun
         (c) 2004 The HW Wilson Co
File 476:Financial Times Fulltext 1982-2004/Jul 21
         (c) 2004 Financial Times Ltd
File 610:Business Wire 1999-2004/Jul 21
         (c) 2004 Business Wire.
File 613:PR Newswire 1999-2004/Jul 21
         (c) 2004 PR Newswire Association Inc
File 621:Gale Group New Prod.Annou.(R) 1985-2004/Jul 21
         (c) 2004 The Gale Group
File 624:McGraw-Hill Publications 1985-2004/Jul 20
         (c) 2004 McGraw-Hill Co. Inc
File 634:San Jose Mercury  Jun 1985-2004/Jul 20
         (c) 2004 San Jose Mercury News
File 636:Gale Group Newsletter DB(TM) 1987-2004/Jul 21
         (c) 2004 The Gale Group
File 810:Business Wire 1986-1999/Feb 28
         (c) 1999 Business Wire
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File 813:PR Newswire 1987-1999/Apr 30

?

29/3,K/5 (Item 3 from file: 621)
DIALOG(R)File 621:Gale Group New Prod.Annou.(R)

01077426 Supplier Number: 40422706 (USE FORMAT 7 FOR FULLTEXT)
Financial Feasibilities Inc. announces "CFO Advisor" financial analysis software
News Release, p1
June 21, 1988
Language: English Record Type: Fulltext
Document Type: Magazine/Journal; Trade
Word Count: 1183

Financial Feasibilities Inc. announces "CFO Advisor" financial analysis software
... 415) 266-1652
MCI Mail: 224-4194

Financial Feasibilities Inc. announces "CFO Advisor" financial analysis **software**

LOS ANGELES, June 21, 1988 -- Financial Feasibilities has announced CFO Advisor (TM) financial-analysis **software** for the PC, running under Microsoft Windows. CFO Advisor is a general-purpose financial management and **problem - solving** tool that goes beyond **spreadsheets** and after-the-fact financial statements, giving chief financial officers, accountants, financial consultants, bankers, stockmarket...

...a user-friendly, hands-on capability for real-time "what-if" analysis and planning. The **software** gives users access to over 75 key measures of a company's current and desired...

...divisions, companies, groups of companies, and period) to measure effectiveness and efficiency and to make **decisions** on organizational consolidations, mergers, and acquisitions. The program solves over 600 financial equations.

According to...

...Feasibilities, "CFO Advisor will fundamentally change the way executives and managers make financial and product **decisions** . It bridges the gap between financial statements and **spreadsheets** and allows for real-time financial **decision** -making based on facts and rational analysis, instead of seat-of-the-pants guesswork. Now any manager or executive can **accomplish** in seconds what previously required financial specialists or mainframe programmers days or weeks.

"Today's **decision** -makers need hands-on, 'what-if' financial analysis linked to current **spreadsheets** , instead of outdated financial statements and reports. CFO Advisor also gives stockmarket analysts and shareholders a highly effective method for determining which companies are making the right financial **decisions** --even for advising companies on financial **strategies** ."

CFO Advisor's basic metaphor is its "Blueprint Screen (TM)"--a diagram that displays a business' key financial elements (which can be imported from the general ledger or a **spreadsheet**). The Blueprint

Screen gives the user an immediate assessment of the company's overall financial...

...or period.

CFO Advisor also allows for in-depth analysis and testing of alternate financial **strategies**
, using "Key Performance Areas" (where management has direct control, such as Selling Price) and "Key...
...corporate returns, such as Return on Net Assets). The user can perform these basic analyses:

Goal Seeking: allows the user to determine the value of one or more chosen Key Performance Areas in order to achieve any desired **objective** . For example: a company wishes to maintain its current Return on Net Assets and needs...

...Net Loss for a company during the period under review. A series of screens in **matrix** format also allows the user to analyze Leverage Sensitivity, Liquidity Sensitivity, and Profitability Sensitivity.

Ratio...

...individual product lines or categories, providing the line manager with a practical tool for making **decisions** .

Raw Materials, Work In Progress, and Finished Goods screens: allow for "what-if" **decisions** on per-item quantities and costs of inventory items.

Fixed Assets **screen** : **displays** the value of Fixed Assets for each asset and group of assets, for given cost...

...from leading corporate general ledger systems--ACCPAC PLUS, Solomon III, RealWorld, and CYMA--and from **spreadsheets**
--Lotus 1-2-3, Microsoft Excel, and SuperCalc 4. Data is dynamically exchanged (via DDE...

...Excel, allowing for detailed "what if" analyses of bottom-line impacts in real time as **spreadsheet** numbers are changed. Data can also be entered directly on CFO Advisor's Blueprint Screen. CFO Advisor is compatible with IBM's PC and Token Ring **networks** , AT&T Starlan, Ungermann-Bass Net/One, 3Com 3+ and Ether series, Novell Netware, and MS **Network** .

Extensive on-screen context-sensitive help and the Microsoft Windows standardized mouse- or keyboard-based windowing/icon/menu system make CFO Advisor usable by beginning **computer** users as well as power users, who can take advantage of standard Windows keyboard shortcuts...
based Goldstein, Golub, and Kessler, one the largest CPA firms in the United States, and **LAN** Services Inc., a leading **network**
systems
and financial- **software** integrator, have agreed to market CFO Advisor, and discussions are underway with Ernst & Whinney, Deloitte
...

...functions except
"print" and "save" is available for $45, reimbursed with product purchase. Local area **network**
and site licenses and a volume purchase
plan are available, along with a Qualified Installer...

...Personal System/2, Compaq Deskpro 386 or 100%
compatible, Windows 2.0 or higher, 640K **RAM** , and hard disk are required. It is not copy-protected.

For further information, contact: Financial...
PRODUCT NAMES: 7372411 (General Accounting & Financial **Software**)
NAICS CODES: 51121 (**Software** Publishers)
19880621